The Farm

QUARTERLY, SUMMER 1954, FIFTY CENTS

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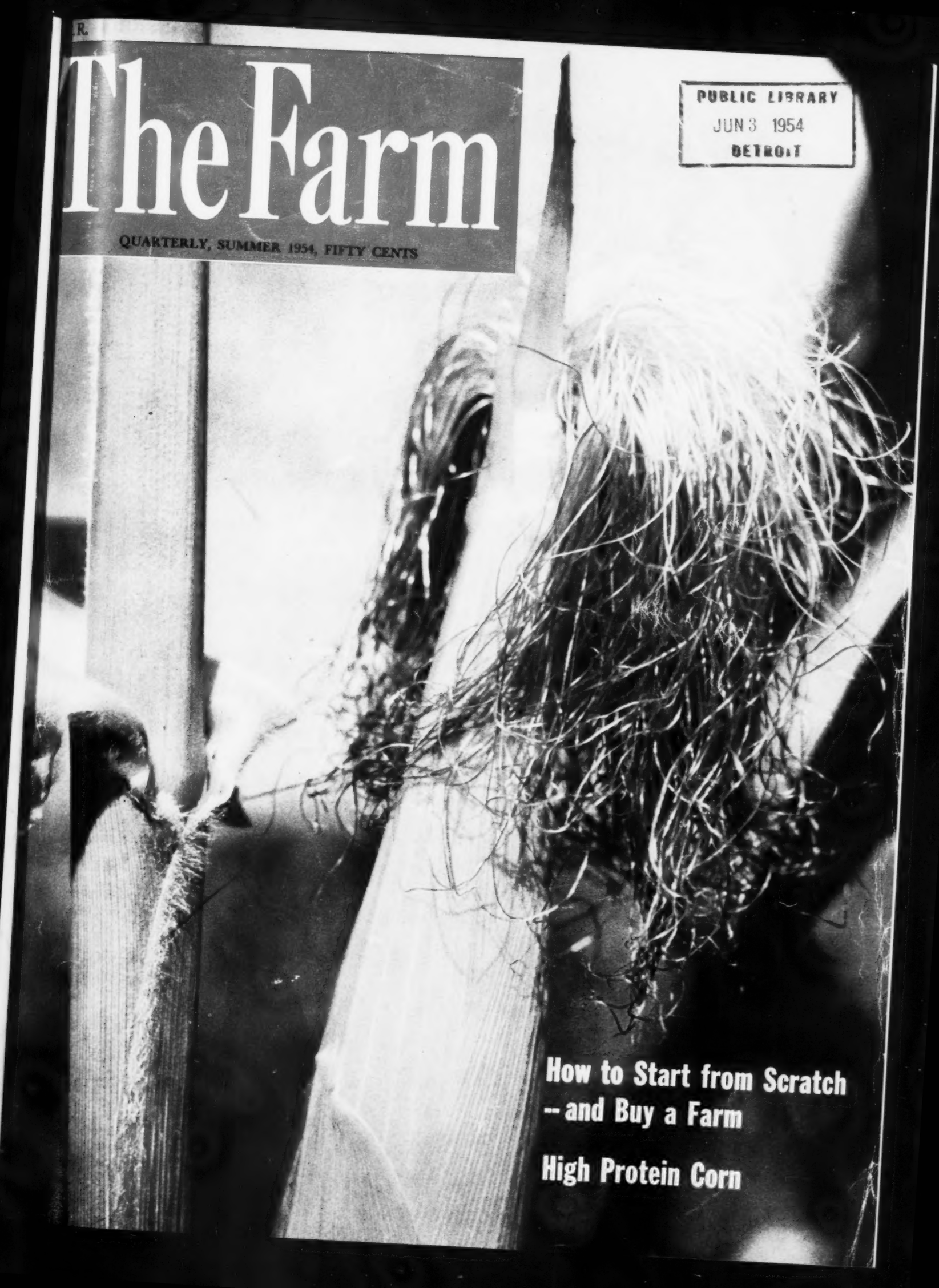

How to Start from Scratch -- and Buy a Farm

High Protein Corn

Only Super-Sure-Grips have the greater pull of "WEDGE-IN" ACTION!

Farmers who have worked with Super-Sure-Grips can't be fooled by other tires *resembling* them. They know that ONLY Super-Sure-Grips have all these all-important features:

RULER-STRAIGHT LUGS, coming closer together *at shoulders,* take a "wedge-in" bite that *firms* loose soil — gives "the greatest pull on earth"!

O-P-E-N C-E-N-T-E-R helps *ruler-straight* lugs bite deeper, pull better!

LONG, EVEN WEAR — for *ruler-straight* lugs work evenly against soil, roll smoothly on road — and so wear slowly and evenly!

RE-LUGGING SAVINGS—for its vastly stronger body keeps Super-Sure-Grip *fit* to re-lug or re-tread — and *re-use!*

That's why, despite imitations, *more farmers surveyed prefer Super-Sure-Grips than all other leading makes put together!* So get the real thing — with its real savings in time, work, gas and money — see your helpful Goodyear Dealer! Goodyear, Farm Tire Dept., Akron 16, Ohio.

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

FIRST in Traction • FIRST in Long Wear *FIRST Choice on the Farm!*

GOODYEAR

Super-Sure-Grip Tractor Tires

THERE'S A SPECIALLY DESIGNED GOODYEAR TIRE FOR EACH VEHICLE ON THE FARM

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Boost pull-power *ON THE GO!*

Match pull-power to the load without shifting gears or touching the clutch! Slow down or increase tractor speed *on the go* to match size of windrows—bale *non-stop* with pto-drive McCormick No. 45 baler.

NEW McCormick® FARMALL®

SUPER **M-TA** *TORQUE AMPLIFIER*

New, revolutionary power take-off performance. Now, with completely independent pto and Torque Amplifier, the new Farmall Super M-TA lets you maintain uniform pto speed regardless of stopping, starting, or changing tractor speed on the go. Above, operator slows tractor speed without shifting gears as he comes to an extra heavy spot in the windrow with the 25 ton-per-hour McCormick 20-C field harvester.

Try the NEW Super M-TA—see how you can boost pull-power up to 45 per cent *on the go*—make round after round and never touch the clutch, the throttle, or shift gears. Ask your IH dealer to demonstrate.

10 speeds forward, 2 reverse

The new Farmall Super M-TA gives you *instant* choice of TWO speeds in each of the five forward gears. This means you get ten speeds forward, including new TA-low of 1⅝ mph and TA-intermediate high of 11¼ mph. Within the wide Super M-TA speed range you always have the exactly right speed to match crop and field conditions.

These new speeds, together with Torque Amplifier, let you boost pull-power, *instantly*, up to 45 per cent. In heavy plowing, for example, you pull through tough spots *on the go* without shifting gears or working at pulled down engine speed.

You can plow up to two acres more a day with a four-furrow plow, and use less fuel per acre! Or, use TA to reduce cultivating speed and step up pull-power to make non-stop turns! Torque Amplifier lets you do *more* work, *easier!*

INTERNATIONAL HARVESTER

International Harvester products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—General Office, Chicago 1, Ill.

Send for FREE information

International Harvester Company
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Please send free illustrated catalog on the New Farmall Super M-TA.

Name_____ ☐ Student

Address_____

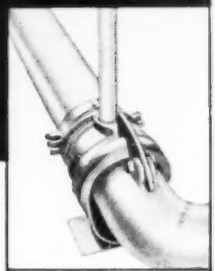
Post Office_____ State_____

I farm _____ acres.

My IH Dealer is_____

There are REAL REASONS why SHUR-RANE® is better!

- the most soundly engineered system in the world —*specially designed and installed for your own soil, crops, land slope, weather, for your own water supply and labor conditions.*
- backed by a national organization that is technically and financially able to *guaranty* satisfactory performance.
- a SHUR-RANE system will never be an orphan — you can always be sure of service, parts and additions.
- a large staff of field engineers backs up your well-trained SHUR-RANE dealer in solving your individual irrigation problems.
- continuous improvements enable you to keep your SHUR-RANE system up-to-the-minute at all times and at lowest cost to you.



SHUR-RANE®

PORTABLE SPRINKLER IRRIGATION

FOR SURE PROFITS!

The most important guaranty of getting a profitable, dependable and easily financed portable sprinkler irrigation system is THE REPUTATION AND ABILITIES OF THE MANUFACTURER AND HIS DEALERS. Each SHUR-RANE installation is backed by the entire resources and research facilities of Food Machinery and Chemical Corporation, the nation's leading manufacturer of irrigation equipment. Why gamble? Be sure with SHUR-RANE.

NEW! See ad describing new SHUR-RANE wheel type sprinkler systems, SHUR-ROLL on Page 89.

SHUR-RANE®
custom-engineered to your own farm
INSURES:

- Larger Yields
- Better Quality Yields
- Faster Seed Germination
- Water Conservation
- Better Fertilizing
- Drought Insurance
- Soil Conservation
- Labor and Time Saving

Partial view of the complete up-to-date engineering department maintained by SHUR-RANE.

Send for **FREE** *booklet today*

fmc
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TRADE MARK

SHUR-RANE IRRIGATION SYSTEMS, DEPT. FQ-S-4
Food Machinery and Chemical Corporation
P. O. Box 145 • San Jose 1, California
If in one of the 14 Southeastern States, send to Florida Division, Lakeland, Fla.

Gentlemen: Please send me my free copy of "What you should know about Portable Sprinkler Irrigation."

NAME_____

ADDRESS_____

CITY_____ STATE_____

Farm Quarterly, Vol. Nine, No. Two. Editorial, Circulation and Executive Offices, 22 East 12th Street, Cincinnati, Ohio. Published quarterly by the Automobile Digest Publishing Corp., Copyright 1954. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the United States and Canada. Entered as second class matter at the Post Office, Cincinnati, Ohio, under the Act of March 3, 1879. (Title Reg. U.S. Pat. Off.)

LOW-WHEELED RAKE AND TEDDER gently fluffs hay into uniform windrows. Tough stems stick out for sun-curing; tender leaves are cradled in windrow center, safe from sun's rays.

NEW IDEA SEMI-MOUNTED MOWER has built-in jack for quick mounting or detaching and storing. Spring loaded release latch protects cutter bar; simply back up to re-engage.

HIGH-WHEELED RAKE AND TEDDER with steel or rubber-tired wheels. Reel yields at both ends. High-fronted basket strips clean, no clogging. Shielded bearings. Converts to a tedder by flipping a lever.

for a better season...

Put New Idea tools on your hay team

If you think hay tools are pretty much alike, you haven't tried a New Idea. When you work with these finer tools, making hay in your fields, you see how efficiently they speed up your job, cut down your work.

There's no circling or backing at corners with a New Idea full-trailing mower, (not illustrated), to cut clean, square corners. The tractor makes a normal right hand turn. Then, just before the mower reaches the end of the standing hay it turns to the right, the cutter bar swings back . . . and starts cutting the next swath. Exclusive equalizer arm and swivel bearing prevent binding or chattering of universal joints.

Both the low and high-wheeled New Idea rakes have been improved to meet the demands of high-speed haying. Control levers are within easy reach from tractor seat. Caster wheel spindle housings are larger, sturdier. Gears, bushings, braces, bearings are stronger, longer wearing.

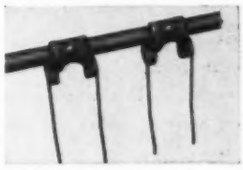
Let your community dealer equip you with these long-lived New Idea hay tools — tools that make better hay, faster.

Both mowers available with hydraulic controls.

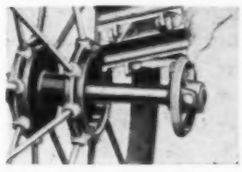
½ turn opens and closes pitman straps; locks cam.

Cutter bar lead adjusts by easy turn of eccentric cam.

Trussed arch frame prevents bobbing; keeps frame and reel aligned.



Patented double curved spring steel teeth handle hay positively, give high lift.



Quick-shift wheel sets out for raking, in for turning windrows. No tools needed.

New Idea FARM EQUIPMENT COMPANY — AVCO

Dept. 1300, Coldwater, Ohio

SEND FREE ILLUSTRATED FOLDERS AS CHECKED:

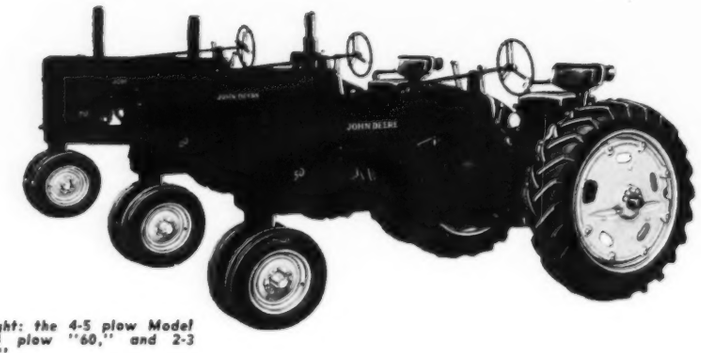
- ☐ Full Trailing Mower
- ☐ Semi-mounted Mower
- ☐ Low-wheeled Rake & Tedder
- ☐ High-wheeled Rake & Tedder
- ☐ Twine or Wire-tie Balers
- ☐ Elevator
- ☐ All-steel wagon
- ☐ Fertilizer Spreaders
- ☐ Manure Spreaders
- ☐ Corn Pickers
- ☐ Hydraulic Loaders
- ☐ Fertilizer Guide
- ☐ Barnyard Manure Booklet
- ☐ Need for schoolwork

I farm_____acres

Name_____

Address_____ County_____ State_____

It's almost as easy as dialing a phone!



Left to right: the 4-5 plow Model "70," 3-4 plow "60," and 2-3 plow "50."

John Deere proudly presents *factory-engineered power steering* for new John Deere Models "50," "60," and "70" Tractors.* It's the biggest news to hit the row-crop tractor field in years because it means *new* freedom from steering effort . . . *new* freedom from driver fatigue . . . safer, faster, more convenient operation.

Every time you take the wheel, the tireless muscles of John Deere Power-Steering save you time and work. In deep sand or mud . . . bedded or irrigated land . . . over rough ground . . . working with loaders or other heavy, front-mounted tools . . . in extreme as well as in average conditions, John Deere Power Steering makes the difference of night and day in handling your tractor.

The John Deere power steering unit is an outstanding engineering achievement. It is an integral part of the tractor, not an attachment. A positive, gear-driven pump supplies hydraulic pressure—through a control valve—to actuate a vane-type motor which turns the front wheels at your command. The motor is completely concealed between radiator and grille and located close to the front wheels where the effort is needed. The entire unit is simple, compact, and quality-built to give years of trouble-free service.

John Deere Power Steering Tractors are on the way to John Deere dealers all over the country. We want you to drive one at your first opportunity and see for yourself how easily and smoothly it handles . . . how you can guide it with one finger if you wish . . . how steady and true it runs when you take your hands from the wheel. Then visualize the *new freedom* that power steering and all of the other modern features of a John Deere "50," "60," or "70" Tractor can bring to you in your farming operations. We feel certain you'll want to join the ever-increasing family of enthusiastic John Deere owners.

Literature describing John Deere's great new power steering is yours for the asking. Write to the address below.

JOHN DEERE • MOLINE, ILL.

**Optional at extra cost*

JOHN DEERE JOHN DEERE QUALITY FARM EQUIPMENT **POWER STEERING**

CHICKEN A LA KING

Seagram

SERVICE TO AGRICULTURE

NO king of old ever realized royal revenues like this proud modern day prince. He is absolute ruler over a vast empire which has reached the staggering total of more than 3 billion dollars a year!

One important reason for the astonishing growth of the poultry industry is the great progress being made in the field of feed research. Exhaustive tests are constantly being conducted to improve feeds and feeding methods, and these tests prove that when Seagram Solubles are used to fortify poultry rations, broilers grow bigger, stay healthier and reach market finish quicker.

Seagram Solubles are rich in proteins, minerals, B-vitamins and other important growth factors. Many feed mixers and dealers rely on this nutritious supplement to enrich the feeds they sell and increase their customers' profits.

Carload lot inquiries are invited.

JOSEPH E. SEAGRAM & SONS, Inc.
Louisville 1, Kentucky
GRAIN PRODUCTS DIVISION

A GRAND MILKING MACHINE ...Back in 1917!

In 1954 It Is Too SLOW and You Have to Ride the CLAW!

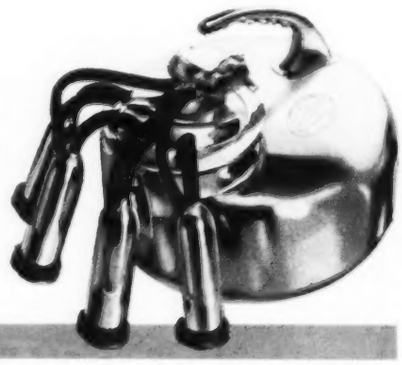
You wouldn't *buy* that kind of milking machine in 1954 and every day a lot of farmers decide to quit *using* that kind of machine.

That is why in 1953 more thousands of farmers than ever before* decided to switch to Surge . . . not just more farmers but more *thousands* of farmers.

No claw riding with Surge because Surge TUG & PULL automatically holds the teat cups down where they belong.

*More than in any previous year.

See your Surge Service Dealer



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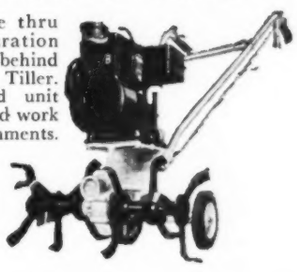
Easy does it
when you use a multi-purpose
CHOREMASTER
WORLD'S NUMBER ONE WHEEL GARDEN TRACTOR

Ramble through lawn, garden chores with Choremaster. Single, economical power unit and low-cost attachments make Choremaster a power lawn mower, cultivator, snowplow. Add sickle bar, many other attachments. Saves you investment, repairs, storage. 1½ to 3 HP.

as low as $153.00 Freight Extra

CHOREMASTER ROTARY TILLER

You'll breeze thru ground preparation when you're behind this Garden Tiller. Self-contained unit does all ground work without attachments. in one operation. Eliminates plow, disc and harrow.



CHOREMASTER ROTARY MOWER

Mowing's fun and safe, too, with the CHOREMASTER Mower . . . blade is fully enclosed. Designed for fast, safe, comfortable lawn and weed cutting. Fine-cuts wide 18 inch swath.

Leaf Mulching ATTACHMENT grinds leaves to fertilizer particles. No more leaves to rake or burn.

Write Today for dealer name, FREE literature!

CHOREMASTER DIVISION
WEBER ENGINEERED PRODUCTS, INC.
806-2 Evans St., Cincinnati 4, Ohio

The Farm QUARTERLY

Summer, 1954, Volume 9, Number 2

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THE FARM QUARTERLY
22 East Twelfth Street, Cincinnati 10, Ohio

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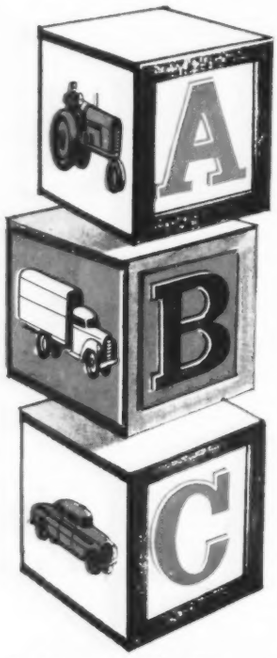
Simple as



Cylinders wear most at the TOP

Chrome-plated piston rings resist wear

Therefore, TOP rings should be chrome-plated to retard cylinder wear!

For longer engine life . . . fewer overhauls, obtain the FULL benefit of piston rings plated with solid chrome . . . not just the oil rings alone, but especially the TOP compression rings because they operate where most wear occurs.

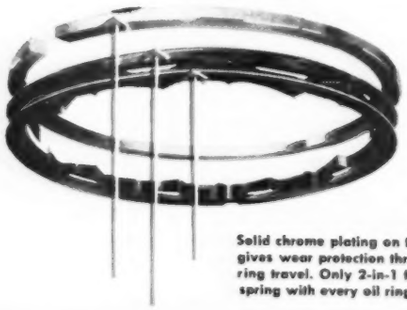
Perfect Circle's 2-in-1 Chrome Piston Ring Set has BOTH top and bottom rings plated with thick, solid chrome. And the result? Thousands and thousands of extra hours of top performance, even under the most severe kinds of farm service!

For new engine life, sustained power and oil economy—with no tedious break-in period—re-ring your car, truck or tractor with 2-in-1! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Canada.

Perfect Circle

2 in 1 chrome piston rings

THE STANDARD OF COMPARISON



Solid chrome plating on top and bottom rings gives wear protection throughout entire area of ring travel. Only 2-in-1 furnishes alternate HiPressure spring with every oil ring, for badly worn engines.

Letters

The Fence Tool

Sirs:

In your article titled "Lifetime Fences" in the Spring issue of THE FARM QUARTERLY, you showed a picture of a handy fence-splicing tool which you said was better than pliers and inexpensive. I haven't seen any such tool on the market. Can you tell me where I can buy one—and just how inexpensive is inexpensive?

Richard S. German

Cozad, Nebraska

For reader German and the 153 others who spotted this handy gadget in the last paragraph of "Lifetime Fences" we have good news. If there is a Republic Steel Company fence dealer near you he will present you with one—free. If there isn't a Republic dealer write FARM QUARTERLY and we'll mail you one, hot off the rolling mill.

Wants No Tariff On Wool

Sirs:

I have read with great interest the article appearing on page 70 of your current edition of THE FARM QUARTERLY entitled, 'Is Now the Time to Start in Sheep?' As a sheep grower I am naturally encouraged by your thesis that declining sheep numbers and increasing population must, in time, result in more favorable markets for native sheep of all classes. It appears that the factual basis for this thesis is unimpeachable.

Since, then, the sheep and wool growers of this country are approaching, or have reached, a time in which the economic facts of life heavily favor their business, I wonder whether it is desirable for them to ask the additional, and artificial help of an increased wool tariff. Such an increase seems inconsistent with our announced national policies in the field of foreign relations, and is at odds with Secretary Benson's efforts in related branches of agriculture in this country. If justifiable at all, the increased tariff must rest upon the grounds that the growing of wool is an activity to be encouraged for reasons of defense. In view of the free market incentives already existing, it seems that the defense argument is, at best, highly debatable.

It is my belief and hope that your article will elicit an interested and enthusiastic response from the industry, and from groups interested in agriculture. In that event, you may find it desirable to issue reprints of the article, and if you do so, may I request that I be placed on your mailing list.

George W. Wolf, Jr.

Amenia, New York

WAYNE "High Energy" HOG FEEDS PACK THE EXTRA POWER YOU NEED FOR HIGH-SPEED PIG GAINS

ONE WEEK TO WEANING feed tasty, tempting Wayne Tail Curler, Jr., the special creep-feed that helps save extra pigs at the start. Gets baby pigs on solid feed *fast*... builds *heavy* weaning weights, up to 40 lbs. and more!

WEANING TO 75 LBS. feed Wayne Tail Curler, Sr. Triple-tested nutrition to keep all pigs *gaining at full speed!*

75 LBS. TO MARKET speed 'em along with your grain and Wayne Hog Balancer. Gets 'em to market *early*—in 5 to 5½ months—keeps production costs extra low!

FEED YOUR BROOD SOWS for extra pigs, too . . . with Wayne Brood Sow Supplement or Wayne Pig & Sow Meal. See your friendly Wayne Feed Dealer now!

WAYNE FEEDS

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ALLIED MILLS, INC. *Builders of* TOMORROW'S *Feeds* TODAY!

Executive Offices: Chicago 4, Ill. Service Offices: Ft. Wayne 1, Indiana

B.F.Goodrich

Power-Grip tractor tire gives you bigger cleats, bigger shoulders!

"Better grip, better traction than other tires!"

Keith Foley sows upwards of 900 acres of wheat on his farm near Cheney, Kansas. One of his tractors is shown above, equipped with powerful, new B. F. Goodrich Power-Grip tractor tires. Foley reports these tires hold better, give better traction than any other tires he has used. That's because knife-action Power-Grip cleats have a bigger face area to press against the soil, take a firm grip for full traction in reverse or forward.

Five types of B. F. Goodrich farm truck tires!

There's a special B. F. Goodrich truck tire for every farm need —five different types from which to choose. The *right one* will save you money. Norman Droese, for example, uses the H. D. Commercial on his delivery truck for trips to the Cleveland, Ohio, farm market.

"Self-cleaning tread in heavy, black dirt"

R. V. Wuensche points to the sharp, clean track left by a Power-Grip tire in the heavy, black soil of his farm near Bishop, Texas. Note that the open-center Power-Grip tread stays clean in this heavy, moist soil to give you better traction.

Count the cleats on leading makes. Time after time you'll find that size for size the BFG tire has more cleats. And no other tire is wider than Power-Grip.

"Less slippage pulling giant loads"

Power-Grip tires pull a corn picker and wagon on the 590-acre Charles Wiese farm at Alda, Neb. These B. F. Goodrich tires are square cut at the shoulders to defy slippage, help Wiese keep on schedule. Power-Grip cleats are higher at the shoulders for deeper penetration, braced to dig in without bending. Every turn of these BFG tires counts for maximum traction.

See your B. F. Goodrich retailer for all your farm tire needs. His address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, Ohio.*

CASE "500"

His Proudest Possession

Think of the finest watch . . . the finest camera . . . the finest automobile you ever saw. Think of precision . . . and craftsmanship . . . and convenience—all carried to the last little detail. Expect all this when you visit your Case dealer for a look at America's Finest Diesel, built as only Case can build it. Take the wheel—see how a gentle hand . . . with Power Steering . . . guides mighty 5-plow power through short turns in soft soil. Yes, you can enjoy the thrill of thoroughbred performance . . . the pride of distinguished possession . . . at a price any farmer can afford who has enough work for a tractor of such size.

America's Finest DIESEL

Get the full story of 6-cylinder diesel power so smooth, so quiet that it purrs as it pulls . . . push-button starting directly on diesel fuel . . . clean burning by "Powrcel" controlled combustion . . . simple construction that combines Case upkeep economy with diesel fuel economy. Send for new diesel catalog. J. I. Case Co., Dept. F-904, Racine, Wis.

Now you can get it!

Opening of the big, new, modern Nitrogen Division plant at Omaha means increased supplies of ARCADIAN® Urea Fertilizer, the excellent nitrogen fertilizer for all crops and all methods of application.

Ideal for plow-down, top-dressing or side-dressing with any equipment for the greatest crop yields per pound of nitrogen used!

New ARCADIAN Urea Fertilizer is just about the most efficient source of nitrogen you can buy. Every 100 pounds of ARCADIAN Urea supplies 45 pounds of actual nitrogen—the highest concentration available in solid fertilizer. It is pelleted for easy handling and flows freely in any equipment. In addition, ARCADIAN Urea has important special advantages that help you get more crop dollars out of each pound of nitrogen you apply.

All the nitrogen in ARCADIAN Urea turns into forms available to plants. Yet it resists leaching even in a long season, and stays in the root zone to feed crops. ARCADIAN Urea supplies quickly-available nitrogen early in the season and provides increasing quantities of nitrogen as crops grow bigger and need more. Its high concentration saves on handling and storage, and speeds the job of application. ARCADIAN Urea is excellent for corn, small grains, sorghum, sugar beets, vegetables, fruits, pasture and other crops.

Plow-down or top-dressing applications of ARCADIAN Urea are economical and efficient. Since ARCADIAN Urea ties itself to the soil particles in the root zone, plow-down on heavy soils is practical anytime plowing is possible. Deep plow-down helps crops grow deep roots to resist drouth better. Even on light soils, ARCADIAN Urea applied in early spring feeds the crop throughout the season.

Side-dressing with ARCADIAN Urea fills the "extra" nitrogen needs of many crops with just one application. Heavy rains don't leach it away and your crops get readily available nitrogen when they need it throughout the growing period.

Airplane application is quick and effective. Concentrated ARCADIAN Urea makes a good payload to cover more acres of ground per flight. The firm pellets spread evenly and don't blow away in dust. Ideal to get nitrogen on crops when the soil is too wet, the area too large, or the crops too advanced for ground equipment.

Use in irrigation water is safe, economical and effective. ARCADIAN Urea penetrates to all the roots the water reaches, stays where the roots can get it. ARCADIAN Urea is ideal, too, for foliage spray applications to tomatoes, apples, high-protein wheat and certain other crops. Application in pest-control sprays saves work and supplies nitrogen that the crops absorb immediately.

LOOK FOR this efficient, economical, new pelleted ARCADIAN Urea Fertilizer at your fertilizer dealer's this fall. When you need nitrogen, better buy ARCADIAN Urea 45% Nitrogen in easy-to-handle 80-pound bags. Ask your dealer now for full information — and write to Nitrogen Division for free literature describing its advantages and many uses.

Arcadian®

UREA 45
45% NITROGEN FERTILIZER
PELLETED

NITROGEN DIVISION Allied Chemical & Dye Corporation
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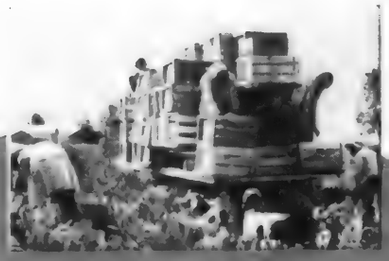


An Eaton 2-Speed Axle

"GETS CROPS TO MARKET FIELD-FRESH"

. . . says truck farmer
Carl Dickman
Auburn, New York

"WE HAVE 100 acres in vegetables. The Eaton 2-Speed Axle is a mighty important help, getting our crops out of the field and to market fast," says Mr. Dickman.

"With a conventional axle, field loading is a constant stop-and-start job—slow and costly in man-hours. With the Eaton Axle we move along without a stop. Having the extra low-range gear, we set the truck speed to match the loading-crew speed; load a lot faster, save plenty of time and do not bog down in soft ground.

"An Eaton Axle makes a truck better on highway runs. The high-range gears enable us to hold good speeds with the engine turning at lower r.p.m., saving gas and wear."

Only with an Eaton 2-Speed Axle can a farm truck get over soft ground under a full load without bogging down. Highway runs are made in shorter time. An Eaton 2-Speed is a real time- and dollar-saver for any farmer. Your truck dealer will gladly prove it with a demonstration.

TWO TRUCKS IN ONE: "With an Eaton 2-Speed you have two trucks in one: in the low-gear range, an ideal truck for hauling from the field; in the high-gear range, a fast time-saving truck for highway runs to market," says Carl Dickman *(right)*. Herman Dickman *(on left)* agrees.

EASIER ON DRIVER: "The Eaton 2-Speed Axle makes truck driving easier. Shifting an Eaton is simple and quick. That's why the truck rides smoother and the driver has better control over it," says Mr. Dickman.

RUGGED, DEPENDABLE: Ford Dealer L. B. Lathrop, Jr., of Henderson & Lathrop, Auburn, New York, says: "Eaton 2-Speed Axles are rugged and dependable—they stand up and give trouble-free service. When we deliver an Eaton-equipped Ford, we know our customer is going to be satisfied."

EATON

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

2-SPEED *Truck* AXLES

MORE THAN
2 MILLION
EATON AXLES
IN TRUCKS
TODAY

PROJECT ADEQUATE ROADS: Crowded highways slow you down, add to your cost of marketing farm products. Join the crusade for more and better roads essential for progress and prosperity.

Jamesway

POWER CHORING

(T.M. PEND.)

Throws down his silage

- Handles any grass or corn silage, frozen or unfrozen
- Mixes frozen silage with center silage, ready to feed
- Prevents silo accidents and cave-ins
- Can be moved from silo to silo
- Easy to service, any time

Save feed and time! Install a Jamesway silo unloader NOW!

Just push the button and watch your silage come down fast — finely chopped, evenly mixed, more palatable. The Jamesway handles your toughest unloading jobs—grass or corn silage, frozen or unfrozen. It breaks up chunks. Mixes feed thoroughly.

Your silage goes further because cattle eat it more readily. They waste less. Clean it up better. Convert it into more milk at less cost. You save labor, too . . . 200-400 hours every year. The Jamesway works while you do other chores. Shuts itself off at any pre-set time you select.

See this and other Power Choring equipment at your Jamesway dealer's now. Let him show you how Jamesway's complete line of stalls, pens, windows with Power Choring equipment gives you the most efficient, low-cost and sanitary dairy layout available.

Water cups

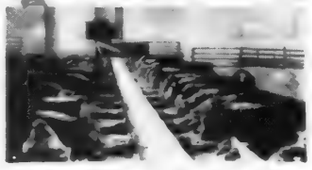
Stalls and stanchions

Feed trucks

Cleans his barn

More farmers buy this Shuttle-Stroke cleaner because it installs easier, costs less, cleans better. Delivers direct to spreader without chains, gears or sprockets in the gutter. Handles once-a-day cleaning. You can clean by hand if power fails.

Feeds his Cattle



Makes cattle-feeding a simple, one-man job. Big capacity! Feed your beef and dairy cattle by just pushing a button. Rugged Shuttle-Stroke action delivers any grain or silage. Fully proven in the feed lot. Works in perfect combination with silo unloader.

Jamesway

Ft. Atkinson, Wis. Mount Joy, Pa.
Los Angeles 63, Calif.

Please send me free folders on the Jamesway Silo Unloader and other Power Choring equipment which I have checked below.

Name .....

Town ..... Route .....

County ..... State .....

(Address request to the JAMES MFG. CO., Dept. FQ-654, c/o your nearest branch office)

☐ Barn Cleaner ☐ Power Ventilation ☐ Barn Equipment
☐ Cattle Feeder ☐ Mechanical Poultry Feeder ☐ Hog Equipment

FIRST IN POWER CHORING

(T.M. Pend)

Dairy Barn

Sweet Tooth Fly's Undoing

It is easier to attract flies with honey than with vinegar, says an old English proverb. And the smart-alec answer has always been :"Who wants to attract flies?" Last year, however, a scientist in Illinois, Willis N. Bruce, decided that there would be a real advantage in attracting flies—particularly if you could lure them to their doom. Bruce began working on this problem in an effort to beat the fly, which developed resistance to the residual sprays such as DDT. There were a number of sprays which would kill the flies, but none of them had any lasting qualities. One of these short-lived sprays, Bayer L 13/59, was mixed with Karo syrup in an effort to attract more flies during its limited period of effectiveness. The poisoned syrup was painted on window ledges and other places where flies gather and Bruce sat back to observe.

While the syrup was still wet it attracted quite a few flies and the poison killed them—just as Bruce expected. Then the unexpected happened. The bait hardened in about four hours into a tough, plastic streak, but the flies continued to come to eat it. And what was completely unexplainable was that the poison, which should have lost its effectiveness, continued to kill the flies. The flies came to the hardened syrup and dissolved it with their salivary secretions, eating both syrup and poison. Within one to three minutes the flies began to reel like drunken tumblebugs and shortly after that they were dead. No flies which ate enough syrup to show signs of poisoning ever recovered. Most surprising of all was that the syrup which had been applied in June was still as deadly as sin in October.

In mixing the bait, one and a half grams of Bayer L 13/59 was thoroughly mixed with a pint of dark Karo syrup. In dairy and sheep barns, Bruce found that a very small amount of his bait would reduce the fly population by as much as 95 per cent. In three laboratory tests where 2,000 flies were released into a large room, the new poison killed from 90 to 94 per cent of them within an hour. After a few hours all had been killed.

As with almost every test that has ever been run on flies, the best results came on farms where the farmer practiced good sanitation and eliminated, as far as possible, fly breeding places.

One of the best features of this new fly killer is its safety in use. Painted only in thin streaks, there is little danger of contaminating food or other material. Even if some of the poisoned syrup were poured on the morning hot cakes by mistake, the results would not be disastrous—it would take two and a half *gallons* of the bait to kill a 150-pound man.

Toughest jobs on wheels . . . are jobs for Kelsey-Hayes

Keeping heavy loads on the move where the going gets tough is routine rolling for Kelsey-Hayes Wheels. They're built to take it. They're engineered for brutal punishment with an extra measure of strength and stamina for steady, trouble-free rolling on the job, any job, anywhere. And the makers of motor vehicles know this. For today, as in the past 45 years, they rely on Kelsey-Hayes for wheels of rugged dependability—wheels for trucks, trailers, tractors, buses and passenger cars.
Kelsey-Hayes Wheel Co., Detroit 32, Mich.

KELSEY HAYES

World's Largest Producer of Automotive Wheels

Wheels, Brakes, Hubs, Brake Drums, Special Parts for all Industry • 9 Plants—Detroit and Jackson, Mich. . . . McKeesport, Pa. . . . Los Angeles . . . Windsor, Ont., Canada . . . Davenport, Ia. (French & Hecht Implement Div.)

Sign of better health for your livestock

Hundreds of new signs like this are going up across the country

A new sign . . . a new graduate veterinarian begins his professional practice.

It's a great day for him . . . and for you, too, because he's a specialist you can rely on to help protect the health of your livestock—and your investment.

If there is a new veterinarian in your community—bid him welcome. He's one of hundreds* of new graduates who are joining 16,500 older veterinarians in playing a vital role in America's livestock industry.

Young or old—your veterinarian is a man of high professional standards . . . a man who subscribes to this creed . . .

"To regard my profession as something more than a means of livelihood . . . To guide my conduct by sober judgment . . . To be modest, and open-minded and thankful for every opportunity to increase my knowledge and my usefulness . . ."

Backed by vast veterinary research . . . by years of intensive scientific study . . . your veterinarian brings to your farm high professional skill for diagnosis, specialized treatment, surgery, and counsel on preventive practices including nutrition.

Vital allies of your veterinarian in conquering disease are effective, reliable drugs. Squibb serves the veterinary profession and you by providing drugs of highest efficacy . . . veterinary products based on sound, authoritative research.

Your veterinarian, plus dependable drugs, and good management practices—*all working together*—help keep your herds healthy, productive, and more profitable.

CONSTANT RESEARCH —Squibb scientists are constantly seeking and discovering new and better drugs . . . to aid your veterinarian in bringing better health to your livestock.

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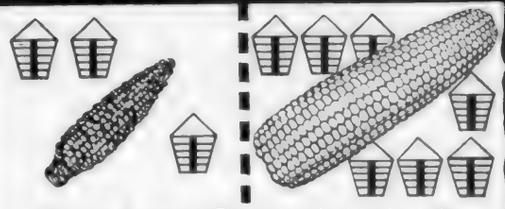
For prompt, accurate diagnosis, always consult your veterinarian.

*More than half of the estimated 900 new graduates will enter general practice. Others will begin important work in specialized practice, armed forces, teaching, research, regulatory or commercial services.

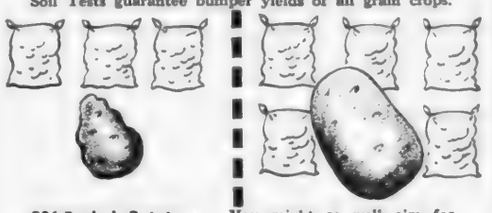
SQUIBB —A NAME YOU CAN TRUST

Here's How to Keep Income UP and Costs DOWN

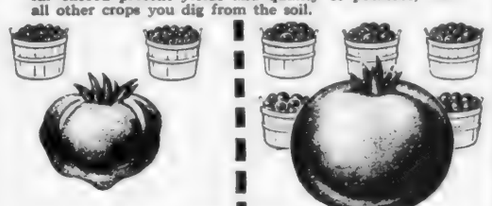
NOT Tested	TESTED



227 Bushels Corn — Balanced soil through testing means perfect ears and bumper crops. Don't risk deformed ears, nubbins, and weak stalks that lodge. Soil Tests guarantee bumper yields of all grain crops.



906 Bushels Potatoes — You might as well aim for this record yield per acre. With soil testing you can far exceed present yields and quality of potatoes, and all other crops you dig from the soil.



30 Tons per acre — Record tomato yields are impossible without soil testing. Truck and canning crops show amazing yields with proper fertilizer. Your Soil Test Kit will be the foundation for more income from your farm.

Increase Milk Production up to 300% — Soil Tests assure thick stands of grass and legumes with deep root systems for more forage and greater milk production. Boost your hay crops up to 5 tons an acre.

Every Crop Does Better on Tested Soil

Make More Money for Yourself

DOUBLE YOUR YIELD

With higher costs for labor and everything you buy, the only answer is to make every crop produce more per acre. Farm authorities agree average yields can be doubled. That's how to offset falling prices — you'll make more money with more bushels even at low prices, than when prices were highest. These easy tests guarantee $10 or more in extra yield for every $1 you spend on fertilizer. You'll get bigger yields of better quality without extra work, or expense — even on reduced acreage.

Do It Now — It's Not Too Late to Boost Your Yield Yet This Year!

Use your **Sudbury Soil Test Kit** ***right away,*** where crops are growing, and know at once what each field needs to produce a bumper yield. It tells you just what to do — exactly how much nitrogen, or phosphate, or potash is lacking and how to apply it NOW. Side-dressing fertilizer after crops are growing is often far more effective than putting it all on at planting time. You'll turn poor fields into money-makers — and make good fields surpass all previous records. "Guessing" wastes both time and money—you'll actually save up to $15 an acre on fertilizer.

Easy as Reading a Thermometer

NO KNOWLEDGE OF CHEMISTRY NEEDED

So simple anyone can use it. Even your first tests will be accurate and reliable. There's no long waiting for reports — the correct answer is printed right on the chart. Takes only 10 minutes, costs less than 10c a test. Ag Colleges, County Agents, Vo-Ag Teachers, Experiment Stations and progressive farmers everywhere depend on it. You'll learn more about your soil than from a lifetime of farming! Even this summer your Soil Test Kit will pay for itself many times over.

Farmers deLuxe Soil Test Kit

Complete with everything for hundreds of tests. More valuable than all your stock and tools! Shows right amounts of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle. Weighs only 12½ lbs. Easy instructions show needs of 225 different crops. **Only $29.95.**

Enthusiastic Users Say:

A.F.B. of Iowa increased his bean yield 50% by correcting phosphate and potash deficiencies.

A.D. of Indiana nearly doubled his corn yields after testing his soil. He also gets 30% more wheat and soybeans per acre.

W.L.D. of Pennsylvania saved $400 on fertilizer. "The Kit paid for itself over and over again."

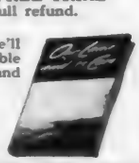
G.H. of Ohio "Have made many tests; like its simplicity and accuracy. Worth 1000 times its cost on my 320 acres."

R.S.G. of Indiana tests his soil and has reduced fertilizer costs by using only what his Sudbury Soil Test Kit showed was needed.

S.H. of Michigan "guessed" his potato field had enough potash but needed nitrogen. Tests showed he was wrong. He used potash, doubled his yield.

SEND NO MONEY — Order your Soil Test Kit today and we'll mail C.O.D. plus postage. Or send check and we'll pay postage, saving you from $1.91 to $3.55 in postal charges. **FREE TRIAL** — If not delighted with your Kit, return it in 10 days for a full refund.

BOOK FREE If you send cash, we'll also include the valuable book on farm management, "Our Land and Its Care" FREE.



Mail Coupon Today!

FREE TRIAL

Better Crops Guarantee

If you don't get bigger and better crops with your Sudbury Soil Test Kit return it anytime within a year and we'll send your money back. That's the *Sudbury Daring Guarantee.*

Also sold on Easy Payments if desired—see coupon.

SUDBURY Soil Test Kits

SUDBURY LABORATORY, Box 256, South Sudbury, Mass.

World's largest makers of Soil Test Kits

Over 400,000 Now In Use

Hardware, Seed, Grain and Farm Supply Stores: Serve Your Customers by Carrying this Essential Aid to Better Farming.

SUDBURY LABORATORY, Box 256, South Sudbury, Mass.

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95: send postpaid: include free book, "Our Land and Its Care."

☐ Send C.O.D. only $29.95 plus postage.

Name .....

R.D. or St. .....

P.O. ..... *Zone* ..... *State* .....

☐ Send on Easy-Payment Plan — I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.

BUY USED EQUIPMENT FROM YOUR CATERPILLAR DEALER

BACKED BY A BOND!

NEVER BEFORE A GUARANTEE LIKE THIS... UP TO $10,000 "INSURANCE" TO PROTECT YOUR USED EQUIPMENT INVESTMENT!

Your Caterpillar Dealer now offers you "BONDED BUY" used Caterpillar-built equipment, guaranteed by a bond equal to the purchase price of the machine up to a maximum of $10,000 and backed by The Travelers Indemnity Company. On the Dealer's Guarantee Bond he clearly states the terms of the guarantee. He *gives* you this protection when you purchase "BONDED BUY" Cat® farm equipment.

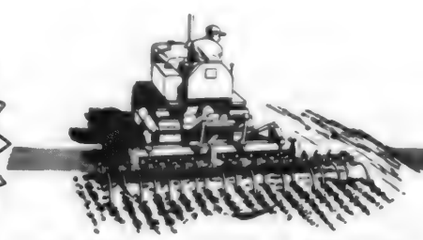
You are also offered two other classes of used equipment buys . . . "Certified Buy" and "Buy and Try" . . . these cover used equipment of *any* make. All equipment is honestly described.

What does this mean to you? You are absolutely sure of what you're getting. Your assurance is in writing. What's more, no matter what your needs, cost-wise or work-wise, you'll find the equipment that fills the bill, backed by a written guarantee.

Only your Caterpillar Dealer makes this offer . . . so make his store your headquarters for *both* new and used farm equipment. See him today! Caterpillar Tractor Co., San Leandro, Calif., Peoria, Ill., U.S.A.

DIESEL FARM TRACTORS • TOOL BARS • IMPLEMENTS

BONDED BUY



DON'T GUESS OR GAMBLE ON USED EQUIPMENT . . . KNOW WHAT YOU'RE GETTING!

1. *"Bonded Buy"*

Only the best in used Caterpillar-built equipment. Each "BONDED BUY" provides a guarantee for thirty days against unsatisfactory performance due to defective parts. If a part should prove defective within the guarantee period under the normal conditions of your job and with proper maintenance, your dealer will put your machine back into operating condition *with no charge to you for parts and labor* up to the amount of the bond. The Dealer's Guarantee Bond is backed by The Travelers Indemnity Company. The "BONDED BUY" symbol on used Caterpillar-built equipment is your assurance of the highest quality used equipment.

2. *"Certified Buy"*

Next best buy in used equipment. "Certified Buy" covers farm machines of any make in good condition. Your performance guarantee is in writing backed by your Caterpillar Dealer.

3. *"Buy and Try"*

Bargains in used farm equipment of any make. Buy and try them for a period mutually agreed upon by you and your dealer. Each "Buy and Try" machine carries his written "money-back" agreement.

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YOUR CATERPILLAR DEALER IS HEADQUARTERS FOR USED EQUIPMENT

CATERPILLAR®

"Bonded Buy" assurance effective only in the U. S. A.

Over The Back Fence

Farm for Sale Cheap *This residence occupies a rural situation adjacent to the Severn Wild Fowl Trust. It faces south and east with a fine view of the Severn Estuary. Lounge hall, 4 reception rooms, 14 bedrooms, 4 bathrooms. Central heating, main electricity, well water and main. Stables, garages, well-timbered grounds, lawns, kitchen garden, orchard, paddock. $12,000 with 11½ acres. 200 acres and 8 cottages available at small extra price.*

This seems like a pretty good buy for a man who likes to give big parties, or a man with a large family and a passle of dependent in-laws. If any of our readers are interested we shall be happy to put them in touch with the owner. We also know of other places, both larger and smaller, at equally attractive prices. There is no catch, and these fine properties are just as represented. The only possible drawback, a minor one, is that they are located in England.

How to Keep Them Down on the Farm They've made a survey of the television habits of Ohio farmers. According to this survey, farm folks who own a television set have developed these amazing social habits: They do 88 per cent less radio listening; they do 87 per cent less entertaining; they go to the movies 77 per cent less; and they do 53 per cent less magazine reading. The question that is bound to come up is, "Is that good or bad?"

Farmer's Friend By the Gallon George Quick, of Phoenix, Arizona, says that 20 gallons of ladybugs (that fine farmer's friend) will control pests on 100 acres of vegetables. He also says that there are 135,000 ladybugs in a gallon, and that they eat 45 other insects, almost all of them bad, and multiply 15 times in 15 days. This item would come under the heading, "Interesting, but so what?" if Mr. Quick hadn't also offered to sell you the ladybugs. That he will do, at $8.00 a gallon. He says that the way to distribute them is to walk along a row of vegetables with a can of ladybugs and scatter them at the rate of a handful every 20 or 30 paces.

Phosphorus made the Difference

This once phosphorus-deficient field (above), renovated in the Fall, was producing lush growth of clover and grasses by early Spring (below). With proper fertilization, which supplied plenty of Phosphorus, worthless brome sedge was replaced with a thick, flourishing stand of protein-rich, home-grown feed. Whether it's more milk or meat you're producing, good legume-grass pasture is your best and cheapest feed.

From New England to Texas, dairy and stockmen report exceptional results in building up and maintaining a high Phosphorus level in their soils by applying AA QUALITY Phosphate Rock, in addition to their regular fertilization program. If you're interested in using AA QUALITY Phosphate Rock on your farm, see your nearby Agrico or A.A.C. Dealer —or write nearest office below. We'll be glad to help you—in any way we can.

Use AA QUALITY Phosphate Rock

FINELY-GROUND FLORIDA PEBBLE PHOSPHATE ROCK — PRODUCED BY THE AMERICAN AGRICULTURAL CHEMICAL CO.

Makers of AGRICO, THE NATION'S LEADING FERTILIZER . . . AA QUALITY FERTILIZERS . . . and 18% NORMAL SUPERPHOSPHATE

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Cleveland 11, Ohio
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Detroit 31, Mich.
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Fulton, Ill.
Greensboro, N. C.
Henderson, N. C.
Houlton, Maine
Laurel, Miss.
Montgomery 2, Ala.
New York 7, N. Y.
Norfolk 6, Va.
No. Weymouth, Mass.
Pensacola, Fla.
Pierce, Fla.
Saginaw, Mich.
Savannah, Ga.
Spartanburg, S. C.
Phoenix, N. Y.

MORE EGGS-MORE MEAT
from your feeding dollar...with
STONEMO GRIT
—say leading breeders!

"Helps birds use feed better"
Bob Parks, Joe Parks & Sons
Altoona, Pennsylvania

"I feel certain Stonemo does a wonderful job of grinding feed in the gizzard, and helps the bird make better use of its feed. This certainly gives you faster growth, or more eggs for your feeding dollar."

"Aids growth — production"
E. C. Foreman, Foreman Poultry Farm
Lowell, Michigan

"We are convinced that a hard granite grit is essential to poultry of all ages and under all conditions for the proper functioning of the digestive system and for normal growth or production. Stonemo Granite Grit has played an important role in the fine records for LIV-ABILITY established by Foreman Leghorns."

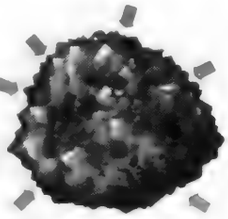
"Greater profit per bird"
J. C. Long, J. C. Long's Poultry Farm
Meridian, Mississippi

"To my way of thinking, Stonemo grit will pay any user real dividends. It enables the birds to do a better job of grinding the feed in the gizzard, and helps them make better use of their feed, resulting in greater profit per bird."

These three leading breeders—plus many, many more—make sure their birds get STONEMO Granite Grit. Read their reasons: *Faster growth ...more eggs...lower feeding costs... greater profits!* The extra grinding surfaces of STONEMO grind feed extra fine...help release more of the feed's growth-promoting and egg-making nutrients. Also, STONEMO is insoluble—will not dissolve and upset the ration's carefully-planned mineral balance. Good feed and good granite grit are *"partners for profits!"* Whenever you order feed, be sure to order STONEMO Granite Grit—in economy 80-lb. bags. Order it today!

GIVE GROWING BIRDS "TEETH"—Make sure your growing birds on range have "teeth" to make better use of feed . . . grind grains and grasses . . . grow faster . . . reduce feeding costs! Give them insoluble STONEMO Granite Grit. Keep it before them at all times.

STONE MOUNTAIN GRIT COMPANY, INC.
Executive Offices and Quarry: **LITHONIA, GEORGIA**
Branch Quarry: **BARRE, VERMONT**



COARSE SIZE STONEMO HARD GRIT MAGNIFIED 5 TIMES

STONEMO the Grit
with the "EXTRA GRINDING SURFACES"

Poultry Yard

No Antibiotic In the Meat Farmers who have wondered if the antibiotic they feed their chickens is showing up in the meat now have the answer. Dr. Harry P. Broquist, of Lederle Laboratories, tried feeding chickens aureomycin at the rate of 50, 100 and 200 grams per ton of feed—10 to 20 grams of aureomycin is the usual amount in farm feeds—to find if any of the antibiotic remained in the meat after long periods of feeding. "No aureomycin could be detected in the liver or muscle of chickens fed 50 grams per ton of feed for twelve consecutive weeks," Dr. Broquist said. "and this was also true for chickens fed 200 grams per ton for six days."

At heavier rates of feeding, Dr. Broquist was able to show traces of the antibiotic in the tissue if he continued the feeding of the material right up to the day of slaughter. "In every instance where the antibiotic was detected in the raw tissue," Dr. Broquist said, "it was completely destroyed when the tissue was cooked. Moreover, when aureomycin was withdrawn from the diet one or two days prior to slaughter, it could not be found in the liver or muscle."

The fear has been that if traces of the antibiotics which are being fed to poultry and swine were present in their flesh and became a part of our diet, we might develop germs which were resistant to these drugs.

FORMULA FOR PROFITS

ONE-MAN PACKAGED FEED PLANT

Shown with 500-lb. Batch Mixer, 10" x 10" Krimper-Kracker and 14" Rotary Knife Granulator. Other sizes 100 lbs. to 6,000 lbs. Any item available separately. Also molasses attachment. CRIMPS, GRANULATES DUST-FREE and operates with small motor or tractor. Discharges correctly balanced rations into bags or trucks. No millwright work or installation cost. PUTS YOU IN THE DRIVER'S SEAT in any livestock feeding program. Users everywhere because it's deliberately priced to sell. Write TODAY for free samples and catalog.

DAVIS BUILT MCD SINCE 1894 **H. C. DAVIS SONS'**

Dept. FG-2 BONNER SPRINGS, KANSAS

"Steel Buildings are the best value on the market for today's farmer"

SAYS MAURICE O. FULLER, CHALMERS, INDIANA

● In regard to his new steel farm building, Mr. Fuller writes: "We have just completed the second steel building on our farm and feel we have taken another step forward in our long-range farm improvement program. We purchased our first steel building about three years ago and erected it ourselves —an open front implement shed, 30 feet wide by 66 feet long. We liked it so well we just replaced our old wood barn with this new steel stock-feeding barn."

Whatever your building needs are—stanchions or loose housing for dairy cattle, beef cattle or hogs; machinery and crop storage—durable steel buildings are easily arranged for labor-saving chores. Mr. Fuller has arranged his new 60 x 108-foot steel building so that his beef cattle are along one side of the barn and the hogs are on the other. Separating them is the convenient hay storage area. Eventually, the building will contain feeding troughs on rollers so that the loafing area can be enlarged as the hay and feed in the center of the barn are consumed. Consequently, as the calves grow, their available loafing space will grow with them. Mr. Fuller has already installed automatic electrically heated watering troughs, and soon intends to install shelled corn storage bins with automatic feeders for his hogs.

"I believe steel buildings are the modern type of farm building and the best value on the market for today's farmer," says Mr. Fuller. "They are fireproof and verminproof. I'm sure we saved money in the initial cost and will continue to save money in maintenance.

"We are well satisfied with these modern farm buildings and glad we have replaced the old buildings with steel construction. Our neighbors and visitors from all around the county have been here to see this new steel building, and they like it, too."

Farmers and dairymen agree that you get the most for your money when you invest in a factory-made steel building manufactured with long-lasting USS Galvanized Steel Sheets for roofs and walls, and a USS Structural Steel framework. USS Galvanized Steel Sheets for roofing, siding and accessories carry a zinc coating of 1¼ ounce per sq. ft.*

*USS Galvanized Steel Sheets for roofing, siding and accessories are coated in accordance with ASTM Specification A-361 (1.25 oz. per sq. ft. ordered coating, 0.90 oz. min. by triple spot test or 0.80 oz. min. by single spot.)

United States Steel Corporation produces high-quality USS Galvanized Sheets and Structural Steel which our customers manufacture into durable farm buildings. Your requests for information will be forwarded to the manufacturers of these buildings, and you will hear directly from them.

USS

SEND THIS COUPON FOR FURTHER INFORMATION

Agricultural Extension Section, United States Steel Corporation
Room 4320, 525 William Penn Place, Pittsburgh 30, Pa.

I am interested in steel buildings for the following:

- ☐ dairy barns
- ☐ grain storage
- ☐ cattle shelters
- ☐ machinery storage
- ☐ hay storage
- ☐ poultry houses
- ☐ other .....

Approximate size or capacity .....
Send information to:

Name .....

Address ..... **Town** .....

County ..... **State** .....

☐ Please have a representative call on me with further information.

UNITED STATES STEEL

"I cleared 18¢ a bushel more with my BUTLER drying equipment"

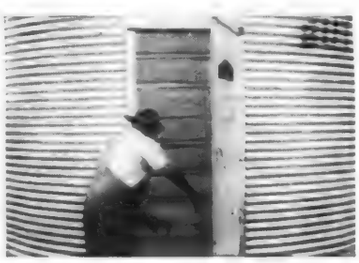
says Elmer H. Miller, White Pigeon, Mich.

"I netted an extra $526 the first year," says Mr. Miller. "My three 1000-bushel Butler bins and Force-Aire drying equipment paid for themselves and paid me a quick profit in the bargain.

"I received 68c a bushel more than if I sold at harvest . . . by putting my 1953 wheat crop in Butler bins and storing it right on the farm. No. 2 white wheat was only $1.58 when I combined. I got the full loan price of $2.26. Figuring the cost of the complete Butler storage and drying equipment — plus electricity, I've cleared 18c a bushel! Butler bins and drying equipment were one of the best investments I've ever made," Mr. Miller states.

Get full value for your grain! Butler bins are U.S.D.A. approved storage for full support prices, ASC (formerly PMA) storage facility loans and fast, 60-month tax write-off. See your Butler dealer or mail coupon for his name and more information.

"15.8% moisture was the test on the first wheat I put into Butler bins . . . but with the Butler crop drying equipment moving a steady column of natural air through the grain, it was soon down to 13%," reports Elmer Miller.



For prompt reply, address office nearest you:

BUTLER MANUFACTURING COMPANY

7378 East 13th St., Kansas City 26, Mo.
978A Sixth Ave., S.E., Minneapolis 14, Minn.
921 Avenue W, Ensley, Birmingham 8, Ala.
Dept. 78A, Richmond, Calif.

I'm interested in Butler bins and the new Butler Force-Aire crop drying equipment. Please send me more information and the name of my nearest Butler dealer.

Name .....

P. O. .....

R. F. D. ..... State .....

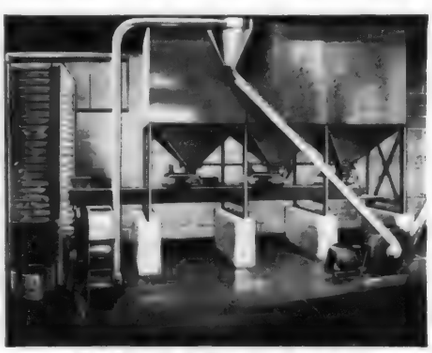
BUTLER STEEL PRODUCTS

Manufacturers of Oil Equipment
Steel Buildings • Farm Equipment
Cleaners Equipment • Special Products

Factories located in Kansas City, Mo.
Galesburg, Ill. • Richmond, Calif.
Birmingham, Ala. • Minneapolis, Minn.

Hot Hens Hens, like cows, slow down on production when the weather gets uncomfortably hot. Just how hot is hot as far as a hen is concerned was studied by Dr. W. O. Wilson of the University of California. He found that at 70 degrees Fahrenheit the birds were comfortable and productive. At 80 degrees, egg size and shell thickness decreased. Egg production declined markedly in heavy breeds and birds with dark plumage at 90 degrees; Leghorns' production fell off at 100 degrees. At 100 degrees birds ate about 42 per cent less than they did at 70 degrees and drank 35 per cent more water. The bird's body temperature, which is normally 106 degrees, starts to rise when the outside temperature is 80 and some birds keel over with heat prostration when the outside temperature is 100 to 105. At this point the bird's temperature reaches 110—a fever that causes them to stagger, but from which they can recover—to 113, which is about the end. Chickens living in houses can cool off by burrowing down in the litter, which is often 10 to 20 degrees cooler than the air. Those living in cages just have to sweat it out—not literally, of course, for chickens, like dogs, can't sweat.

The heat problem is so acute with cage raisers of chickens that many of them have installed sprinkling systems which spray the henhouse roof once or twice an hour during blistering days to reduce the temperature.



BELL'S NEW FEED-O-MAT

FULLY AUTOMATIC FEED HANDLING SYSTEM

Empties Cribs and Bins—Blends ingredients for Balanced rations—Grinds, Mixes and Delivers Feed to the point of use—

ALL THIS WITHOUT HAND LABOR! PUSH THE BUTTON—the electric Automatic Control takes over! Time Switch automatically stops Feed-O-Mat at end of predetermined grinding time . . . Any combination of corn or grains can be handled with equal ease with this time saving piece of equipment on your farm. Available now at extremely moderate cost. Drop a card for full information, and name of your nearest Bell Distributor.

THE C. S. BELL CO., MFRS.
HILLSBORO, O. - Since 1858

NEW WAY

to make lower-cost MEAT and MILK

from feeds you grow!

The "spark" for better digestion of the entire ration your cattle eat is quality feed containing ARCADIAN* Urea Feed Mixture

Low-cost meat and milk production depends on the idea of balanced feeding for the bacteria in each animal's rumen or first stomach. The better these bacteria are nourished, the better they break down and convert grain and roughage eaten by cattle into nutrients the animals can digest. This makes meat and milk production more economical—you get more out of every scrap of feed.

You "spark" this breakdown of feeds for better digestion by supplying quick sources of energy and protein for rumen bacteria to thrive on. They grow faster if part of the nitrogen for protein comes in the quickly-available form of ARCADIAN Urea Feed Mixture—and also if some of the energy is quickly available from the starch of grain or the sugar of molasses. Better-fed bacteria break down more of the cellulose and other fiber in roughage and grain, releasing more nutrients from inside the fibrous cell walls. Thus, feed value otherwise wasted goes into making valuable meat and milk.

Better feeding of both the rumen bacteria and cattle is made possible by using high-quality supplements that contain ARCADIAN Urea Feed Mixture. Such quality feeds supply essential nutrients needed to balance those in roughage and home-grown grain, stimulating rumen fermentation profitably.

Beef herds on dry range or poor hay do better with a quality supplement containing ARCADIAN Urea Feed Mixture, which unlocks extra feed values in roughage. Because urea is a rich source of protein, it makes room in the concentrate for extra minerals, vitamins and energy. Results show up in better growth, better wintering and bigger calf crops. Feed lot cattle also make lower-cost gains with rations containing ARCADIAN Urea Feed Mixture.

Dairy cows need plenty of good roughage and high energy feeds to maintain good milk flow. They get more out of all feed when the concentrate contains as little as 5 to 15 pounds of ARCADIAN Urea Feed Mixture per ton. You can get urea in regular mixed dairy feeds or in supplements for mixing with home-grown grains.

Arcadian

UREA FEED MIXTURE

The benefits of urea are widely acclaimed by Experiment Stations, ranchers and farmers. Urea helps provide you with high-quality mixed feeds and concentrates. Results show that it develops extra feed values from the entire ration. See your feed dealer today for feeds containing ARCADIAN Urea Feed Mixture. Ask him also for booklets on how it works, or write to the address below.

*Trade-Mark

NITROGEN DIVISION Allied Chemical & Dye Corporation

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NITROGEN DIVISION ALLIED CHEMICAL

"Does a Lot More Work and Saves Me Money, Too!"

This is not just one farmer's opinion. You'll hear statements like this from owners wherever today's Ford Tractor has had a chance to show what it can do. Here are a few typical examples:

A Minnesota Ford Tractor owner has this to say: "I have some light and some fairly heavy soil. I have never used more than 1½ gallons per hour pulling three 14-inch bottom plows and you can cultivate 20 acres on 5 gallons. That puts money in any farmer's pocket."

From a farmer in New York State: "I like the new Ford Tractor because we have a very hilly farm and the Ford has lots of power, low down, good brakes, very easy to handle, cheap to operate."

An Indiana farmer says: "I plowed 150 acres of land with my new Ford Tractor; 100 acres of this was corn and the other 50 acres was oats. This was more farming than many of my neighbors did . . . with larger tractors."

Here's one from Nebraska: "I can make my Ford Tractor do as much work on less fuel than any other make of 3-plow tractor which costs twice as much money."

A grain farmer in Missouri wrote us this about his new Ford: "It will do more work per gallon-hour than any other tractor regardless of make or size and I don't bar the big boys either."

And from a general farmer in Oregon: "The Ford Tractor has everything a man could ask for in size, power, handling and economy."

These few statements will give you some idea what owners of today's Ford Tractor are saying—and perhaps of what you'd be saying if you owned a Ford. How about arranging with your nearby Ford Tractor Dealer for a demonstration? Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

Lower first cost, proved operating economy and higher resale value make the Ford Tractor your best power buy

Ford Farming MEANS BETTER WORK . . . MORE INCOME PER ACRE

Sam Kennedy (left), Butler dealer, points out a feature of the Force-Aire unit to (from left) Arthur F. Brauer, owner of the building, Jack Kennedy, Butler dealer, and Lloyd Brauer, Arthur's son.

"My BUTLER crop storage building lets me harvest sooner, cut field loss,"

says Arthur F. Brauer of Stonington, Ill.

"Last year, before my Butler crop storage building with Force-Aire drying equipment was installed, I didn't harvest my corn till late in September," says Mr. Brauer. "By that time it was down to about 13 per cent moisture content and my field loss was high.

"But now, with Butler drying equipment, I can harvest two to three weeks earlier—at 22 to 24 per cent moisture—and reduce field loss. Then, by storing in my new Butler building, I can bring the moisture down to a safe level with the Force-Aire unit.

"I'm sure of getting the support price—and maybe holding for an even higher market price—when I store in my 6,800-bushel 32′ x 48′ Butler steel building. What's more, the building is weather-tight and rodent-proof. This keeps my crops clean for better feed and higher prices when I sell."

Lloyd E. Brauer examines ears that shelled excessively in field—result of harvesting late when proper drying equipment is not available. Brauers now have Butler Force-Aire drying equipment, plan to pick three weeks earlier.

Butler buildings and Force-Aire equipment are U.S.D.A. approved, eligible for ASC (formerly PMA) storage facilities loans. Grain storage structures qualify for the fast, 60-month tax write-off. See your Butler dealer or mail coupon for full information.

BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY

Manufacturers of Oil Equipment • Steel Buildings
Farm Equipment • Cleaners Equipment • Special Products

Factories located at Kansas City, Mo. • Minneapolis, Minn.
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979A Sixth Ave., S.E., Minneapolis 14, Minnesota
921 Avenue W, Ensley, Birmingham 8, Alabama
Dept. 78A, Richmond, California

Please send me more information on Butler crop storage buildings and Force-Aire drying equipment for corn, grain, soybeans and hay.

Name_____

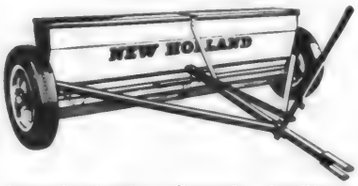
Address_____ County_____

P. O._____ State_____

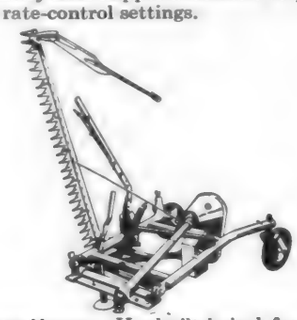
Which machine do you need *right away!*

...TO TEAM WITH NEW HOLLAND BALERS FOR MORE EFFICIENT GRASSLAND FARMING

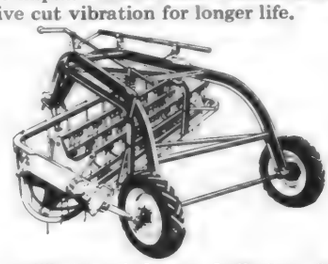
(see opposite page)



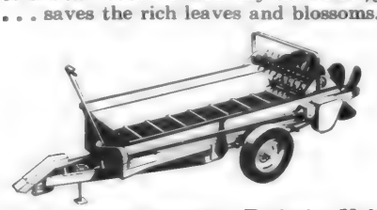
Spreader-Seeder—Spreads fertilizer or sows seed with amazing speed and accuracy for big savings, increased crop yields. Auxiliary seed hopper available. 70 positive rate-control settings.



Tractor Mower—Has built-in jack for easy hook-up. 7-ft. cutter bar handles heaviest stands at time-saving ground speeds up to 5 m.p.h. Tubular steel frame and belt drive cut vibration for longer life.



New "Rolabar" Rake—fluffs hay into quick-drying windrows without whipping. 5-bar reel moves hay at right angles to swath—cuts forward hay travel 50% ... saves the rich leaves and blossoms.



P.T.O. Manure Spreader—Exclusive Uni-Lever Control lets you choose four apron speeds, run apron or beaters separately. 130-bu. capacity. Extension sides available for forage box conversion.

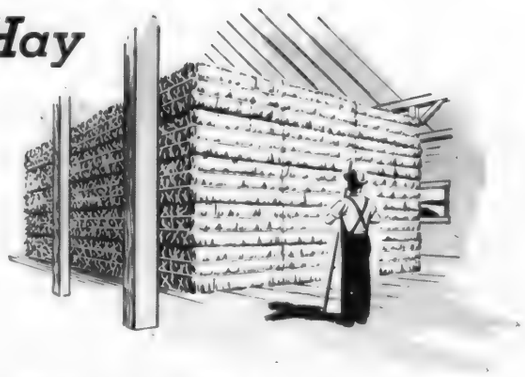
Wagon Gear (not shown) has four-ton capacity. Automotive steering keeps wheels under the load. Has adjustable reach for different length bodies.

NEW HOLLAND

"First in Grassland Farming"

"BRICKLAYING" *with Baled Hay*

A New Holland educational service article for Grassland Farmers



Building a stack of bales which will not fall apart is something like laying bricks. J. G. Ballantyne tells you how to do it the easy way . . .

(Editor's note — This article is based on a story which appeared in Power Farmer. It is re-printed by permission of Farmer and Stock-Breeder Publications, London, England. The author is J. G. Ballantyne of the New South Wales Dept. of Agriculture in Australia.)

FOR BUILDING GOOD STACKS, bales of even size and even density are required, and the baler should be adjusted to deliver such bales.

Select the site for the stack carefully. It should be dry, well-drained, not subject to flood, level. Before deciding on the size of the stack, it is necessary to know the approximate number of bales to be handled. You can get this figure from your bale counter or by a visual check.

Rectangular stacks are easier to build than square ones, which are useful only when a small number of bales is being stacked. The length of a rectangular stack is relatively unimportant, but the width and height should not be too great. A stack which is less than 12 ft. wide should not be more than six layers of bales high in the walls. Larger stacks which are 15 or 18 ft. wide may have up to eleven bales in the walls.

After deciding the width and height of the stack, the length can be set when the number and size of the bales are known.

Before stacking, some bedding material, such as loose hay or straw, should be spread evenly over the site to prevent the first layer of bales being spoiled by contact with the ground.

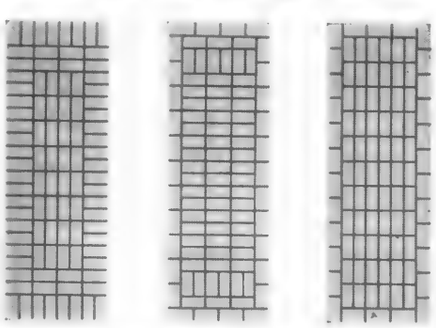
It is also advisable to place an extra layer of bedding or timber on the edge of the stack site. This can be up to 6 inches in height, under the outside edge of the outside bales. This tilts them inwards and adds to the stability of the stack, makes building easier.

Bales in the foundation layer should be carefully placed and kept well apart. The gaps between the bales may be up to 3 inches wide. These gaps allow for uneven length of bales in the upper layers, and also add stability through having the greatest surface area at the bottom of the stack.

In the walls, bales should be stacked with the hay ends pointing down to shed water. Elsewhere, lay the bales on their wide side to increase stability.

As a rule, every bale should be laid to cover the "joint" where bales meet in the layer below. The importance of this "bonding," as in bricklaying, is easily the most important factor in successful stack building. Only in very small stacks is it possible to place every bale to a rigid predetermined pattern, but it is advisable to have some general design in mind when building.

How To Build A Rectangular Stack



First, fourth, seventh and tenth layers — *Second*, fifth and eighth layers — *Third*, sixth and ninth layers

The building of each layer should begin with the ends and the work continued until the center of the stack is filled. Care must be taken to keep the walls perpendicular and the corners solid.

No attempt should be made to keep the center of the stack high. Best results are obtained by building each layer level or with the center slightly lower than the walls. Stacks are often built with the outside bales well bonded to form a wall and the center filled with bales laid in any direction.

In case of trouble, a tie can be used to strengthen the corners and prevent slipping. A length of twine or baling wire is fastened to the two bales which form the corner and tied to a bale nearer the center of the stack.

The New Holland Machine Co., a subsidiary of The Sperry Corporation.

New "Super 77" in action during field test on a private farm in Ohio.

Only NEW HOLLAND lets you choose the right baler for your farm!

Now there's a complete line of 4 New Holland balers—twine-tie or wire-tie—to bring new speed and economy to your farm's haying program . . . regardless of farm size or income!

The increased feed value in a mow of rich, leafy hay can make big savings in your production costs. A proven way to get richer feed is speed in harvesting. Your New Holland dealer carries a line of 4 balers that bring speed to every farmer.

For the big acreage farm or custom operator, there's the new "Super 77" twine-tie that bales up to 12 tons an hour. For the commercial hayer or man who likes wire, there's the Mighty "80" that kicks out compact 100-lb. wire-tied bales.

For smaller hay acreages, the new "66" PTO bales up to 7 tons an hour with a 2-plow tractor! The famous engine-powered "66" gives the same high capacity with a 1-plow tractor.

Prices start at $1457.25 (Suggested list price F.O.B. Factory—plus Federal Excise Tax on tubes and tires). The New Holland Machine Co., a subsidiary of The Sperry Corp.

New Holland Twine is certified by the U.S. Testing Co. for strength, uniformity, length. New Holland Wire is specially annealed for the fast twisters of the Model 80.

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The live-action clutch on the new "66" PTO solves p.t.o. baling's biggest problem . . . lets you shift tractor gears *without waiting for the baler flywheel to stop turning!* No other well-known p.t.o. baler has this practical feature.

FREE! For your free copy of an 8-page, factual booklet, "Here's the way to put up top-quality hay," write: New Holland Machine Co., 906 Maple St., New Holland, Pa.

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I am interested in (check) ☐ "Super 77" ☐ "80" Wire-Tie
☐ "66" P.T.O. ☐ Engine-Powered "66" ☐ A demonstration ☐ Trade-in

Drink more milk **Eat more meat**
for a healthy America and a strong agriculture

FREE! NEW BOOKLET ON HYBRO-TITE*

Nature's own 20-mineral SOIL CONDITIONER

Read how it has helped grow BIGGER YIELDS of grain, row-crops, grass, legumes, fruit ...at LOW COST!

Nature's own 20-mineral
SOIL CONDITIONER
HYBRO-TITE
This new discovery may help YOU
• Get bigger and better yields
• Cut your labor and fertilizer costs
• Make extra cash for extra quality crops
• Increase the value of your land

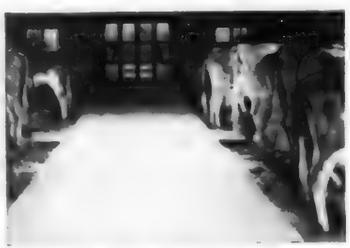
WRITE TODAY!

GET YOUR COPY!—Send for this new free booklet. It gives you full facts on Hybro-Tite—low-cost, easy-to-use natural rock soil conditioner. It tells how potash and 19 trace minerals in Hybro-Tite may improve your soil...unlock growth-promoting elements...and help you grow bigger and better yields.

MANY SUCCESS REPORTS!—This valuable booklet gives many reports of enthusiastic Hybro-Tite users...tells how they have boosted yields of grain, hay, pastures, row-crops, fruit and vegetables... how many have brought worn-out or problem soils into more profitable production with use of Hybro-Tite.

APPLY NOW!—It's never too early, or too late to apply Hybro-Tite. Minerals are released gradually over several years. Hybro-Tite is easy to apply—like lime. Apply now to pastures, orchards, wheat ground, other fields—also vegetable gardens. Send for free booklet, *"Nature's Own 20-Mineral Soil Conditioner."* Mail card or letter today!

ANOTHER VALUABLE USE FOR HYBRO-TITE



Saddleback Farm, Dorset, Vt., sprinkles Hybro-Tite on barn floors to prevent slipping.

HELPS PREVENT SLIPPING—Spread on dairy barn floors, Hybro-Tite helps prevent cows from slipping. One user writes, "Since we started using Hybro-Tite, some 6 months ago, I don't believe we have seen a cow slip, let alone fall."

Woodrow Follett, Mgr., Saddleback Farm, Dorset, Vt., says, "We have never used a product that works as well to prevent animals from slipping going in and out."

Later, Hybro-Tite is carried out to the pastures with the manure, where it acts as a valuable soil conditioner. Hence, it does two jobs—at one low cost!

*Trademark of Potash Rock Company of America, Inc.

FREE LAWN AND GARDEN FOLDER, TOO!

Yours for the asking! Get this free folder: *"Build Better Lawns and Gardens with Hybro-Tite."* Read how many gardeners, home-owners, professional nurserymen have grown more beautiful dahlias, African violets, chrysanthemums... more vigorous shrubs and trees... greener, more luxuriant lawns. *Inexpensively,* too! Drop a card today!

POTASH ROCK COMPANY OF AMERICA, INC.
Box FQ-S, Lithonia, Georgia

Farm's Books

Handbook of Agricultural Chemicals, by Lester W. Hanna. Published by the Author, Forest Grove, Oregon, $3.25.

The multitude of chemicals used in agriculture has long since grown beyond the number which anyone but a mnemonic wizard could possibly remember. For those who are not blessed with photographic memories, Lester Hanna has prepared this book which lists each chemical and formulation of chemicals used as a fertilizer, fumigant, fungicide, herbicide, insecticide, or rodenticide. In addition to giving the chemical make-up, the uses, the directions for application, and the results which can be expected, the book also lists the dangers, precautions, and antidotes to be used with each chemical. Altogether, a handy reference for the farm book shelf.

The Macmillan Wild Flower Book, by Clarence J. Hylander, illustrations by Edith Farrington Johnson. The Macmillan Company, New York, $15.00.

For those who like to name the flowers they find on their early spring excursions through the woods, this book is a joy. Over 500 plants are described in its 480 pages and the text also contains a section on the botanical features used in identi-

install WATER LINES with PLASTEX Measure Marked PIPE
TRADEMARK

Equip your farm with permanent, laborsaving water lines that will never rust, rot, corrode or accumulate scale. Flexible PLASTEX PIPE is low cost, easy-to-install . . . ideal for drinking water, irrigation or drainage.

Ask for PLASTEX at your hardware, plumbing or farm supply store—it's Measure Marked for positive identification and easy, accurate measuring. Write for folder.

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PIPE & EXTRUSION CO.
404 Mt. Vernon Ave., Columbus 3, Ohio

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SWINE ENTERITIS • CALF SCOURS • SWINE PNEUMONIA

C. R. D. • BLUE COMB • HEXAMITIASIS • SINUSITIS

AUREOMYCIN*

CHLORTETRACYCLINE *Soluble* Lederle

Sick animals and birds need *fast, effective* treatment! Now you can give them a powerful medication in a *matter of minutes.* Use the new AUREOMYCIN SOLUBLE. Simply mix it in the drinking water, milk or milk replacer. It dissolves quickly and completely.

Use AUREOMYCIN SOLUBLE to treat chickens with air sac infection or chronic respiratory disease (C.R.D.) and blue comb—and turkeys with sinusitis mud fever and hexamitiasis. Use it to treat enteritis and bacterial pneumonia in pigs —scours in calves! AUREOMYCIN SOLUBLE works wonders in treating all these diseases!

Get these additional advantages by using AUREOMYCIN SOLUBLE to—

1. *HELP* your birds and animals to fight off these diseases when past experience has shown them to be a local problem!
2. *START* your chicks and poults on AUREOMYCIN SOLUBLE to get them on *feed* quickly, to help get them off to a fast start, and to reduce early mortality from these poultry diseases.
3. *HELP* your animals and birds with AUREOMYCIN SOLUBLE when they're under stress from vaccination, moving or other changes in management.

Keep a supply of AUREOMYCIN SOLUBLE on hand! See your veterinarian, druggist or feed dealer, Write for free literature.

*Trade-Mark

LEDERLE LABORATORIES DIVISION
AMERICAN CYANAMID COMPANY
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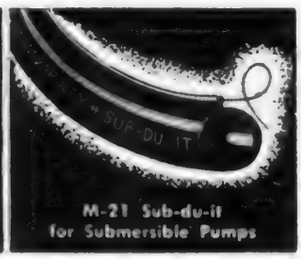
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fying and describing plants as well as a highly simplified key for identifying the flower families. Although the text is excellent, the illustrations are the major feature. Mrs. Johnson has done a superb job of water color illustration. Her paintings are detailed enough to be used for identification without sacrificing the artistry which insures that this book will make fine winter browsing. Though many of the plates are used to show two flowers and a few show three or four blooms, the large pages are uncrowded or cluttered. Altogether, this is one of the most satisfying books we have seen in its field. Our only suggestions for improvement would be that we would have loved to see the Venus flytrap digesting a fly and that the leaves of the pipsissema were too pale—perhaps it needed a little more nitrogen.

Soils and Fertilizers (4th Edition), by Firman E. Bear. John Wiley & Sons, Inc., New York, $6.00.

In his foreword to the fourth edition of this agricultural classic, Dr. Bear says: "Soil, like faith, is the substance of things hoped for, the evidence of things not seen." Soil, being the basis for all agriculture as well as for all of life, is one of the most complex materials which we have to study. The functioning of the soil involves the delicate balance between the chemical elements, the micro-biological life, the mechanical structure of the soil,

(*Continued on page* 95)

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How Digest advice "pays off"

Mr. T. J. White of Eolia, Mo., writes us:

"In the Fall of 1952 things were looking pretty black for the hog business. I had five gilts that I was planning to get rid of at $35 a head. The Digest said to hold gilts and farrow early and so I decided to take its advice. The gilts farrowed early in March and I sold $2,050.00 worth of pigs off them at $26.35 a hundred. Today those gilts are worth $65.00 apiece. That decision made me some money when I needed it the worst way. This letter is to say thanks—and keep my reports coming."

His experience shows how money can be made by following the practical advice of the

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We have many letters from subscribers telling how the Digest made or saved them money. Similar advice is given on Cattle, Corn, Soybeans, Cotton, Wheat, Oats, Poultry, Tobacco and other agricultural products.

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"With what they have to work with, they are the world's best farmers", says Fred Knoop about the Mayan Indians of Yucatan. Mr. Knoop spent a spell on Yucatan farms and in the Autumn issue will tell the story of how this amazing people, who gave us the seed from which our modern hybrid corn was developed, built one of the world's great civilizations. The FARM will bring into the open the long-standing feud between the show ring and the beef producers, and tell how to construct a forage self-feeder for cattle. Rabies will be thoroughly investigated and the question, "How important is sanitation in the Hog Pen?" will be discussed. Various types of winter ground cover for cropped fields will be listed and evaluated. The International Wheat Agreement will be cleared up for those who want to know who sets the prices, and there'll be an entertaining story on farmers who raise horses for the Grand Circuit and the county fair races. Mechanical contrivances which will keep drinking water ice-free during the winter and automatic poultry feeding and egg gathering machinery will be described. There'll be an article on a new method of feeding calves for the veal market and one on the new rotary cutter. Sesame, the sensational new crop which might solve some of our grain acreage problems, will be examined. Features will include pieces on the midget Guinea Cow, Mrs. Curtis' famous family guide, river log drivers, termites, and Pennsylvania barns.

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They started from Scratch

A man needn't have a rich uncle to own a farm today; hard work, a good wife, and thrift will do it

GRANDFATHER'S own version of how he got rich—he owned two big farms when he retired at 78—made a good story, even though we suspected that he over-elaborated as he got older. It went something like this: "Started from scratch; didn't even have a shoestring—wore boots in those days—just turned seventeen. Went to work for Lafe Adams over on Salt Creek for $20 a month and found. Saved it all; didn't spend a cent for six months and bought a young mare from Lafe, and he gave me keep for her. Bred the mare and in three years I had a team and $300 in the bank. Bought a second-hand plow and harrow and some harness and rented 40 acres of corn land off Lafe's brother. Had some brush to clear off that winter, and the land was pretty thin, but I got a fair crop.

"When I was 23 I had a cool thousand in the bank and I put it down on 80 acres further down Salt Creek and got married. Had a mortgage as big as the seat of my pants on it, and a two-room log house. It wasn't much, but I soon owned it.

"How did I do it? Hard work, son, just hard work."

The economist can take a pencil and a piece of paper and figure out that this can't be done today. You are lucky, he says, to get the worst kind of land for a hundred an acre, and good land goes on up to three hundred and more. Grandfather bought all the tools he needed for about $300—today the minimum equipment for a small farm may run to five figures. Even with the higher farm wages—ten times what grandfather got—there aren't enough working years in a man to save that kind of money.

But in spite of the statisticians and the economists, it is being done today. It may not be as easy as it once was, but the ingredients for success are about the same—hard work, good management, the right kind of a wife, and perhaps a banker or relative or friend who wishes you well. Good management should include a shrewd eye for a penny, and how to hold on to it. Young men with nothing but their own brain and brawn are starting from scratch and either own, or are well on their way to owning, a farm and the equipment to work it.

The last war set a rather definite date for the young men who are just now getting on their feet, and it set a pattern. Many of them saved some money while in the service and added to this by a spell of work in town. Like their fathers and grandfathers, they were helped by friends and relatives, either by loans or advantageous rental terms. In a survey in Minnesota of young fellows who have started farming in that state between 1948 and 1953, more than half had less than $3,000 to start with. Of the 317 who reported, more than half got loans from relatives. Others went to banks, insurance companies, and the government. Most of them started with a share rental arrangement.

THE FARM went into the South, the West, the East, and the Midwest, and selected outstanding examples of young, get-up-and-go farmers whose careers prove that America is still the land of opportunity for the young fellow without a rich uncle. Here are the men, with a few details about their farms and how they went about their ambitious designs.

Howard Agee of Kentucky

If you get a lucky break on good land the going is easier than in the hills of Kentucky where they say they plant corn by shooting it into the hillsides. Howard Agee, a husky, handsome ex-sailor, lives at the end of a dead-end road at the foot of a "holler" near Corinth, Kentucky.

When he was graduated from high school in 1940 he worked for a time on his father's farm over in the west part of the county. In 1942 he went into the Navy, where he spent three years in various parts. In 1944, he married his boyhood sweetheart, a girl from the next farm, and they began to save their money. When he was discharged in 1945 he went to work at Curtis-Wright in Columbus, Ohio. But he was not happy; the farm called him and after a few months he took his wife and baby back to the home place and rented his father's farm on a share basis. With the farm went a team of horses, the only motive power he had. He took on an extra tobacco patch from a neighbor, and put in a field of corn on another neighbor's farm.

By 1947 he had enough cash to buy six three-week old pure-bred Holstein heifers out of Wisconsin. He paid $47 a head for these, the basis for his present dairy herd. A year later he bought a tractor and some other equipment and began to look around for a farm he could buy at the right price. He found about what he wanted near Corinth, a 130-acre place which he bought for $14,000. It had a good silo, a fair dairy barn, and an unimproved old dwelling.

He had $2,000 in cash of his own, he swung an $8,500 G.I. loan, and friends chipped in $3,500 on personal notes. He had 12 cows and heifers, a tractor, a team, and odds and ends of equipment. His best asset was a willingness to work the clock around. He put out his tobacco, 2½ acres, and rented another 1½ acres; his wife helped him in the tobacco, makes a full-time dairy hand, takes care of their two children, and teaches 4-H sewing.

HOWARD AGEE of Kentucky served in the Navy, teamed up with a thrifty wife, saved, and bought a dairy farm in the Kentucky hills.

VIRGIL HULL of Illinois says if you work the clock around, save more than you spend, you'll get along. Starting as a farm hand, he now farms 375 acres, grosses $20,000.

Last year he put 9 acres of corn in his silo, took 40 tons of hay from his meadows, seeded and fertilized his pastures, and bought some new equipment. He grossed $7,000, and made two payments on his G.I. loan. His milk checks averaged $400 a month; his tobacco was good.

He will buy a milking machine and put water in his barn this fall, he believes he can double up again on his loan payments. Not long ago when he was considering a PCA loan, they inventoried his chattels at $19,900. When he cuts down his G. I. loan a little more, he has his eye on a 60-acre piece near him. As they say in those parts, "He will git along."

Virgil Hull of Illinois

Virgil Hull, a short squat man who has hard work written in his bowed legs and square hands, is the son of a farm laborer. When he had reached the third year in high school, working summers and after school, his resources ran out; he remained out a year, worked, and returned to finish. That was in 1937. From 1937 to 1941 he drove a livestock truck for $12 a week (good weeks, with overtime, he made $15) but he knew and liked farming, and quit his job to work as a hired hand on Bill Spenger's farm, where his father worked. He was married in 1944 and had enough money for furniture, "with a little bit over."

By 1946 he had enough saved for a down payment on two milk cows and six gilts. That year Spenger let him have 80 acres, and he put in 15 acres of beans, 15 of corn, and 15 in oats, on the halves. He had the remainder in pasture for his stock. He used his landlord's machinery and continued to work as a hand.

At the end of that year he sold his hogs for $1,200, bought a team of mules and some beaten up machinery, and rented 240 acres. He put in 100 acres of beans and 50 acres of corn and took two litters each from 23 sows. He shucked all the corn by hand, sold his mules and bought a tractor. There is a gleam in his eye when he tells of topping the all-time bean market with his crop, sold at $4.20.

In the fall of 1949 he heard "the Johnson place" was for sale. He sold everything he could spare, got an insurance loan for $8,000, and paid $17,000 for the 80 acres. Driving home from the county seat in his pickup truck, the only car he owned, he calmly informed his wife that they had $4.50 in cash to face the winter.

That fall he and his father-in-law cut

osage orange posts, by axe and crosscut saw, for bread and butter. They got half the posts, each of them a fourth. The posts sold for 75 cents each.

Hull's 80 acres were not nearly enough to contain Hull's firecracker energy. He went across the road and rented the 240 acre farm where he had first worked as a farm hand. Then he took on 55 acres adjoining his own farm. He has a corn-hog-cattle operation, feeding all his own grain and buying some. He's fattening 88 hogs and 67 cattle, had 21 gilts to farrow this spring, and a family cow. His machinery includes two tractors, a combine and a two-row corn picker. He hires one man by the day at times during the busy season. He will gross $20,000 this year.

He has doubled up on his insurance loan payments, and will pay out this year. There are two fat hogs in a deep freeze in the kitchen. After the plaster is off the farm there will be a bathroom, then a television for the kids, two boys, 8 and 5, and a girl, 6.

Mrs. Hull says that if she should suddenly come into possession of $500 she could spend on anything she wished, she would put it on the mortgage. "We've lived pretty close," her husband says. "But we've had a lot of help. Bill Spenger gave me my chance, and the insurance company gave me a big loan. Anybody could do it."

Wiler Weaver of Michigan

Wiler Weaver is not a colt any more—he's pushing 50—but he got a late start, and just at the time when farmers were going broke and their farms were going back to the loan companies. He was 29, unmarried, working as a construction laborer, when his father announced to the family one evening that he could no longer meet the interest payments on the home farm. Wiler decided to take over the $5,500 mortgage.

What happened during the next year, 1933, still confuses him. He paid the interest, repaired fences and buildings in his spare time, but failed to find anyone who would re-write the mortgage. Then he had two breaks. An angel in the guise of a neighbor offered to let him have $3,500: he married and found his wife had $1,000 saved from teaching school; he put in a few hundred dollars he had himself. The deal was made.

In lieu of a debt his father owed him he took over two teams of horses, one of them a pony and small mule, odds and ends of machinery ready for the junk pile, and the 215 acres of sandy, rolling land. That was in 1934.

The next five or six years were tough sledding. Weaver hired no help, putting up 30 to 40 tons of hay a year alone, drove a school bus for 10 years. He increased his dairy herd, raised hogs. He used his milk checks to live on, set aside his hog and grain money to pay on the mortgage. "Instead of buying things we needed we just got along," says Mrs. Weaver. They didn't own a refrigerator until 1943.

The house was falling apart. Weaver cut timber out of his own woodlot for lumber, practically rebuilt the seven-room house himself. He did outside work with his big team, got an occasional job of bricklaying and cement work.

By 1948 the mortgage was paid off. The second hitch in home remodeling was completed in 1944. The war years brought in the cash. He bought an additional 40 acres, took on his mother-in-law's 96-acre farm when his boy was big enough to help. In 1949 he bought $9,000 worth of new machinery, and started some custom combining and corn picking.

This year he is feeding out 82 head of hogs, his milk checks average $170 a week. The farm grossed $17,000 in 1953.

What are the Weavers' total assets? Mrs. Weaver, who keeps the books, isn't sure. "Let's see," she says, "we've got $12,000 at Sturgis, some bonds, about $5,000 in a savings account, a checking account—" and her voice trails off.

Weaver is a township trustee. The Weavers and their four children are doing fine.

Mahlon Dunkel of Indiana

This summer of 1954 finds Mahlon Dunkel with his first crops growing on his brand-new 160-acre farm in Lagrange County, Indiana. Dunkel is 29, married, with two children, and a Navy veteran with one year of service in the Atlantic and two years in the Pacific.

Dunkel is a good example of the value of a good name and a reputation for reliability. He spent his savings from service pay for an automobile. He literally started from scratch, for all he had when he bought the 160-acre farm, which he now owns, was his signature and his reputation.

Left an orphan, he was taken by his grandparents and worked on their farm until he had finished his third year in high school, when he enlisted in the Navy. He spent three years in the service, coming out in January, 1946.

He straightway went to work as a hired hand on a farm. A shy person, he got around to popping the question in 1948, married Doris Collins, a Maine girl he met in the service. In 1949 he went to the FHA and asked for $3,500 to buy livestock and machinery he needed to work a farm. He had no collateral, but he got the loan. He sold his car and bought a ton truck. He went on a 178-acre farm, not too good, but good enough that he paid back the loan in two years, and had added to his stock and tools, and had outfitted his home with a deep freeze, automatic washing machine, and refrigerator. He milked 18 cows, morning and evening, fed 90 hogs, and worked full time as a carpenter during most of those two years.

When he made his last payment on his loan the FHA people told him: "If you can find a good farm for sale, come to us for the money."

Dunkel found what he wanted, a 160-acre farm, good land, but no fences, no-good buildings. He bought it for $17,000. The deed is in the names of Mahlon and Doris Dunkel, but the $17,000 mortgage, he says, "is nothing. Give me three or four years and I'll pay it off."

He moved to the farm early last spring with his 16 head of dairy cattle, 10 gilts, and enough machinery to get along. He has corn, oats, grass, and wheat. The Conservation people helped him with his plan-

WILER WEAVER of Michigan started from scratch during the Depression, built his own house, made hay alone, paid off the mortgage on a 255-acre farm.

ning: he attends every extension course he finds in the county, and keeps up with the latest in feeding and management. He plans to put in an irrigation system next summer.

When he has a moment to spare, he works on the house and outbuildings, does some custom work, puts in a day now and then as a carpenter.

"I wouldn't be anything but a farmer," he says softly. "There's always something new, always a chance to get a bigger crop. I like being my own boss and I like the idea of raising my kids on the farm."

He has his eye on 40 acres which join his place on the south. His neighbors say he will have it before very long—and that is only the beginning for this young veteran with the good name.

Lloyd Yarbrough of Missouri

Lloyd Yarbrough, who always wears a smile, grew up on a farm where the human back, plus some help from horses, was the chief means of getting work done. He wanted none of it. After three years of college he started teaching school. Then two events began to change his outlook on farming—he was married and the Big Depression came along. He decided that it would take him longer to starve to death as a farmer than as a teacher: he began a little farming on the side, on his mother-in-law's farm, but continued to teach for another year. In 1933 he started full-time farming, building up his machinery and dairy herd.

"In those days," he said, "there wasn't very much machinery around. I believed that big machinery, and lots of it, was the secret of success in farming."

In 1940 he was ready to branch out. He went to a 240-acre farm with 60 acres of good bottom land. He had a bumper corn crop the next summer, and by 1942 had $6,000 worth of machinery, 30 head of cattle, some hogs and sheep. He made his next jump, to his present farm of 480 acres. He has been here 12 years. "Under the terms I have this is better than owning a farm," he says. "When I find just what I want, I'll buy a place, but I'm in no hurry."

He cash rents the buildings and pastures, goes half with his landlord on the grain crops. His livestock operation is his own. Last summer as cash grain crops he had 120 acres of wheat, 85 acres of beans, and fed half of 60 acres of corn and oats to his stock. He has a five-year rotation—grass, beans, corn, oats, wheat—and is a firm believer in grass silage. Has a 150-ton concrete silo and puts up 220 tons in two trench silos. "I use the silos as grass banks," he said. "During last summer's drought I opened up two silos I had filled three years ago. It was as sweet and good as when it was put up." He'll pasture and ensile 125 acres of hay this summer.

Fortune smiled on Yarbrough. In early 1942 he bought 6 registered Angus brood cows, had 30 brood sows, some sheep, and 70-odd head of good-grade cattle. He bought $4,000 worth of new machinery, and decided to go in exclusively to raising pure-bred Angus. He sold his hogs and sheep.

Then Madame Misfortune gave him a good, resounding kick in the pants. The same night he had pulled his unassembled new machinery into his barn, a late September storm drove in out of the west. A bolt of lightning sent everything up in flames. He lost 26 acres of corn silage, almost all of his other feed, all his machinery.

The next morning he went down to the bank. The banker tells of the meeting. "Yarbrough came in and smiled at me. 'You know all that machinery I bought? Well, it's gone and I'd like to have a loan to replace it.' You can't turn a man down when he smiles at a time like that."

Yarbrough started again, almost from scratch. He reduced his livestock to 30 head, bought new machinery.

His machine shed today would make any farmer's eyes bug out—a self-propelled, 12-foot combine, two-row corn picker, 12-foot drill, silage chopper, three tractors, and an automatic, wire-tie self-propelled baler. He has all purebred Angus, 38 producing cows, 2 herd bulls, 14 two-year-old heifers, young stock—in all 82 head. They are bred for the range, with legs long enough to travel after grass, necks long enough to reach the grass. "I want to get away from the show-ring type," he says. "I'm breeding for ruggedness."

He filled 18 silos last year, 3,300 tons in all, combined several hundred acres of wheat besides his own. "My custom work pays for my home operation," he says. His labor outlay won't exceed $300 a year.

He has an inventory of $23,000 in equipment, $20,000 in livestock, and last year grossed $16,000. His Angus herd, several years in the making, is now ready to produce cash. Next year, when his 52 cows turn in a calf crop, his gross should double.

Yarbrough started twice from scratch, both times with a smile.

Beryl Kane of Iowa

Beryl Kane and his wife took hold of their bootstraps in 1940 and started pulling together. Today, with no outside help except normal credit, they own $109,000 in land and chattels, and last year grossed $48,000 on their 370 acres.

MAHLON DUNKEL of Indiana found a good name better than great riches. He parlayed that good name with hard work to buy a farm.

Both 35, Kane is a high school graduate; Mrs. Kane had some college. Before they were married in 1939 Kane worked as a hired hand and Mrs. Kane taught school. By 1940 they had saved enough money to buy a few sows and a couple of milk cows. They moved in with Kane's parents and went 50-50 shares on the farm, the elder Kane matching his son's stock. Both he and his wife got into the habit of working from dawn to dark in the fields, a habit they still indulge.

A year later Kane moved to a rented farm on a share basis. He had two teams

(*Continued on page* 116)

LLOYD YARBROUGH of Missouri quit school teaching to farm during the Depression. Burned out once, he started again. His barns are full of fine machinery; his pastures, silos, and grain bins feed a top Angus herd.

3 good reasons for making grass silage

By A. M. Mathieu

THERE ARE three good reasons why a farmer who feeds cattle, either dairy or beef, should consider grass silage if he is interested in cutting down the cost of feed without sacrificing quality. The first reason is that almost every farmer has more grass in late spring than his animals will eat. Since putting grass up for hay in unsettled weather usually means washed-out hay that ends up as bedding, making silage of the grass may save a crop that otherwise would either be lost or greatly damaged as feed.

There's a stout second reason to use late spring grass for silage. Average hay keeps 60 per cent of its nutrients; silage keeps 90 per cent. Since it's the nutrients, not the feed volume, that makes milk and meat, grass silage beats almost any hay except that put up with a dryer or crimper.

The third reason for grass silage is good enough for most farmers; cattle do well on it.

What Mix Is Best For Silage?

If you have a favorite pipe mixture, the chances are you'll have your favorite grass mix. Some are better than others but it's mostly a matter of what you get used to. The mix you want will vary with the climate but there is one rule of thumb: divide legumes with grasses, letting legumes be the smaller part. In that way, cattle will be less inclined to bloat when the field is pastured, and the silage itself won't incline to water saturation that holds back fermentation.

What seeds are best to plant? Brome and alfalfa; orchard grass and alfalfa: orchard, brome and and alfalfa; orchard, brome, fescue and timothy with alfalfa and ladino. Sudan and soybeans are popular mixes. Except for the sudan-soy combination, sowing of grasses in spring with a companion oats crop, is better, on a 10-year average, than sowing grasses and legumes into grain in February. By sowing oats and grass in spring you lose out on a harvest the first season except for 10 or 12 bushels of oats that can be combined from the nurse grain crop. However, the grass stand really takes hold and lasts for 4 to 6 years, especially when the mix is varied enough so that some of it catches on nearly every part of the field. Here's such a mix: 5 pounds brome, 1 pound orchard, 2 pounds fescue, 2 pounds timothy, 4 pounds alfalfa and one-half pound ladino. In a mix of this kind, the brome, orchard and fescue are sown by hand first, and then followed with a drill that seeds the companion grain crop (oats at 6 pecks to the acre) along with the ladino, alfalfa and timothy. When seeding this in, 400 pounds of fertilizer to the acre (of the kind your soil requires) gives the seeds the boost they need to beat a spring drought. An annual early spring drilling of 200 pounds of fertilizer on this mix will keep it replenished and it will stand for 6 years before turning to rank orchard or brome. About the time cherry trees bloom and before pasturing, the field usually has to be mowed to keep the orchard or brome from running away from the legumes and shading them out. If, instead of mowing, cattle are turned on the field in early spring, they will eat down the legumes and kill them.

A brome-alfalfa mix often lasts 3 years in alkali soil that that is kind to alfalfa, but in run-down soils the alfalfa thins out quickly. The above mix gives slightly acid and poorer soil a chance to show what it can do.

For a quick silage yield with high tonnage, sudan and soy are great, although sudan is dangerous when pastured after frost. The beans go in first, then the sudan, crosswise, after the beans are high enough and tough enough not to snap off under machinery.

When To Cut

Grass has more protein and nutrients when it's young, so the best time to cut it for silage is when it is just high enough to

GRASS SILAGE is a forage bank that can be drawn on for high quality feed every month in the year. Even with the best pasture you can expect to get only three or four months really good grazing.

IF grass silage is made from as much as 50 percent legumes, and cows are fed all of it they can eat, the boughten' protein usually can be eliminated. That can mean a saving of one-fourth on the grain bill.

make a windrow. The higher you let it go, the more trouble. First, it will be drier and springier, which means you have to tramp down and level the stuff inside the silo after every load; second, your need for a preservative is increased; third, the actual nutrients per ton that your cattle will get out of the silage is decreased as the grass grows taller and older. When the head is just starting to come out of the boot is the time to mow grass.

How To Mow And Wilt

The old method was a three-trip affair. First you went around the field and mowed; then you windrowed. On the third trip, your forage harvester picked up the windrows and chopped and blew them into the wagon. Some years ago, this was cut down to two trips when an inexpensive bar was offered by most of the tractor companies ($30 to $40) that fits on the mower. It windrows as you mow, a real joy. This windrow won't do for hay as it doesn't kick it up fluffy enough, but it's fine for silage. However, on a field that hasn't been scouted over for stones, wire and rusted hand tools, it's safer to hire a man, if you can

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High Protein CORN

When the protein content of corn is raised, the quality of the protein is lowered. Is high protein corn worth the effort?

IF WE COULD make high protein corn yield as well as our regular hybrids and produce a high quality, balanced protein, we'd have the world by the tail on a down-hill pull.

Not many of us realize it, but corn furnishes more protein for our livestock than any other single feed even though corn's protein content percentage-wise has been slipping steadily for the past 10 to 15 years. It isn't that corn ever was high in protein—it used to average around 9.5 per cent and has now slipped to around 8.5—but we produce such an enormous crop that the total corn protein can hardly help being our most plentiful supply of this vital material. This recent loss of one per cent of our corn protein may not sound like much, but when three billion bushels of corn lose that much protein it is like losing all of the protein supplied by two and a quarter million *tons* of soybean meal, which would cost in the neighborhood of $157,500,000. To pull these figures down from the stratosphere and put them in farmer terms, you might say that a difference of one per cent protein in 10 acres of corn with 75 bushels to the acre would equal all the protein a farmer would buy in 22 bags of 20 per cent dairy ration.

Small wonder, with such figures as these in mind, that geneticists began trying to develop a corn with more and better protein. The effort to improve the quality of corn protein is a relatively recent project; the breeding experiments on quantity of protein go back to 1896 when the University of Illinois began their famous high-low protein experiment. In that year the University made their first planting of Burr White, an open pollinated variety of corn which had an average protein content of 10.9 per cent, and selected the ears having the highest and those with the lowest protein content. Each year, tests were made and the high and the low protein seeds planted until today the highest of the high protein corn runs over 20 per cent and the lowest of the low contains less than 5 per cent protein.

Other corn breeders have carried this experiment still further. The geneticists who produce hybrid corn have used the Illinois high protein corn and have line bred strains of high protein corn themselves to be used as parent stock for a high protein hybrid which contains 13 to 15 per cent protein and yields much better than the Illinois open pollinated high protein corn, but not as well as other commercial hybrids.

While the geneticists have been developing a corn with an inherent ability to produce more protein in its grain, Walter Colvin and Dale Friday, agronomists with the Allied Chemical and Dye Corporation, were doing a little detective work trying to find where the missing protein had gone. They weren't satisfied with the statement of the pessimists that our hybrids had lost some of their power to produce protein. Knowing that protein is distinguished from other food substances by its content of nitrogen, they decided to see what a good shot of nitrogen in the soil would do. Since their employer is one of the nation's big producers of nitrogen, it isn't exactly surprising that this experiment should have occurred to them nor is it surprising that Allied Chemical and Dye Corporation took a kindly, paternal interest in their tests. The results of the experiments, however, are surprising.

Working with the agronomists of the Ohio State University and the State Extension Service, Colvin and Friday arranged for a number of on-the-farm experiments to test their theory. The experiment was very simple; on each farm they arranged for the farmer to plant a part of his crop with an application of from 40 to 80 pounds of nitrogen to the acre over and above the regular fertilizer he used on all of his land. At harvest time they checked the yield and had chemical tests made on representative samples of both plots of corn to see if the extra nitrogen had affected the protein content. Yield per acre jumped anywhere from 20 to 50 bushels while the extra nitrogen and protein content of the corn was

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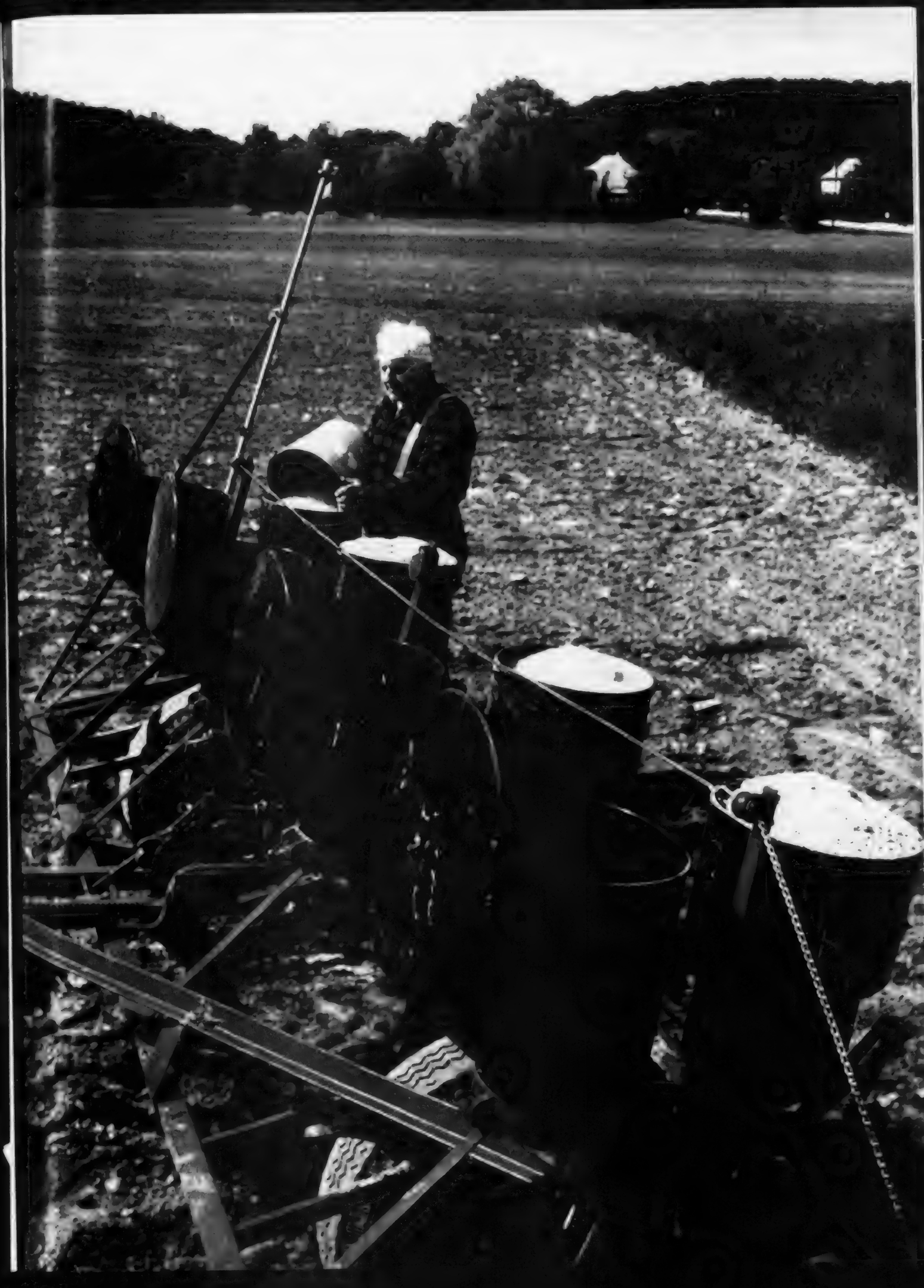
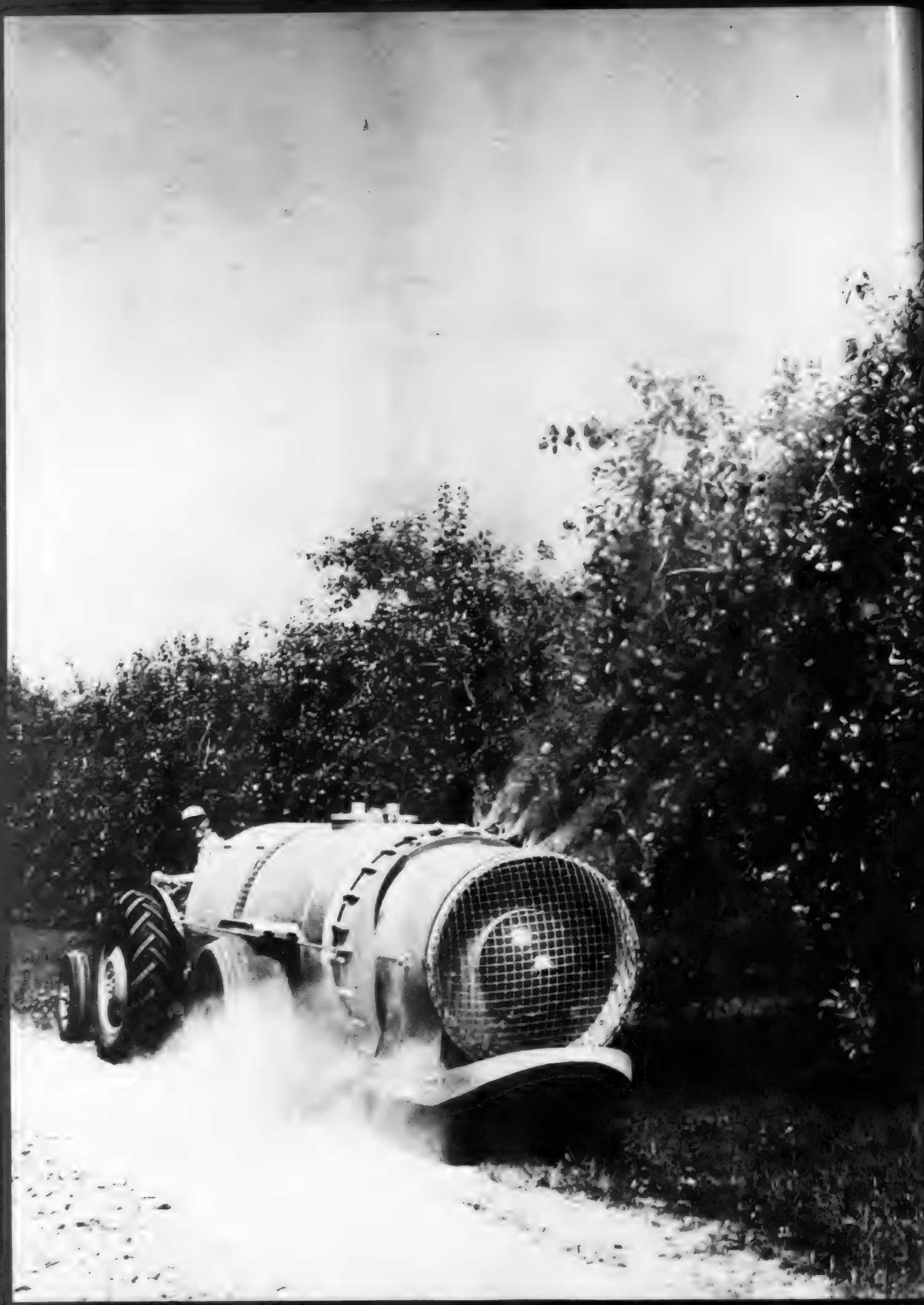
EXTRA NITROGEN raises the protein content of any corn, whether open pollinated, hybrid, or specially bred high protein corn. Pigs need a protein supplement fed high protein corn; cattle do well on it alone.





Are Spray Chemicals TOO HOT *to handle?*

By Grant Cannon

FROM somewhere in the circle of quiet people an earnest, troubled voice broke the silence of the Quaker meeting: "Dear friends, I have a concern which is troubling me deeply and I would like to share it with you. On the farm and in the orchard we have been using chemical sprays to protect our grain and fruit from insects and diseases. Now I read that I may be poisoning or bringing cancer or other sickness to the people who are eating the crop. It seems almost as though science, which has helped us increase the amount we raise to feed the hungry world, is causing us to do an evil thing. . . ."

The fear of poisoning or of being poisoned has been on the increase in the past few months due, in part at least, to a number of newspaper and magazine articles which range from an expression of a physician's qualms as to what *may* be the effect of spray residues on our food, to the most sensational horror stories such as the one whose title screamed, "They Are Feeding Us Cancer!" In most of these articles the reader is left with the impression that we are at the mercy of the chemical companies who are peddling poison without regulation, or regard for its effect upon the nation. Since only a few of the fungicides and weed killers are poisonous and since most of the rat poisons are well known and accepted as poisons, most of these blasts are directed at the insecticides.

Two of these terrifying articles are typical of the more restrained group. One of them tells of a farmer who sprayed 29 head of cattle with TEPP to keep flies away. When he had finished with his cattle he began spraying the hogs. Before he had finished this job however, the cattle suddenly and unaccountably began staggering and falling. Within 15 minutes, the entire herd was dead.

The other article, written by Dr. Morton Biskind and originally printed in a medical journal, was spread far and wide in the newspapers. Under the heading "Science Cites DDT as Root of Trouble for Man and Beast," the newspaper story summarized Dr. Biskind's article, "DDT came in general contact with people in 1945. Since then, Dr. Biskind said: 'There have been a number of curious changes in the incidence of certain ailments and the development of new syndromes, groups of symptoms, which spell out diseases never before observed. A most significant feature of this situation is that both man and all his domestic animals have simultaneously been affected.'

"These ailments he listed for man as: Hepatitis, which is inflammation of the liver; polio: disorders of the heart and arteries and

ORCHARDS are sprayed nine to twelve times during a season to fight disease, fungus, and insects which attack them. Some claim that spray residues accumulate in animal and human tissues in toxic amounts. Scientists say that under normal conditions this is next to improbable.

WHO gets the ear of corn, you or the worm? Without insecticides we would be share cropping with the bugs.

of the gastro-intestinal tract; cancer; unusual forms of pneumonia; retrolential fibro-plasia, a blinding disease of prematurely born infants; excessive fatigability and muscular weakness; neuropsychiatric symptoms.

"For beasts he listed these: Hyperkeratosis or 'X disease' of cattle; an increased incidence of hoof and mouth disease; vesicular exanthemata of hogs; 'blue-tongue,' 'scrapie,' and 'over-eating disease' of sheep; Newcastle disease of chickens; 'highly fatal hepatitis X' and 'hard-pad disease' of dogs.

"Not one of these, except hoof and mouth disease, is mentioned in the Department of Agriculture's handbook, 'Keeping Livestock Healthy,' issued in 1942.

" 'This coincidence alone should have been sufficient to rouse a suspicion that something new, that is common both to man and his domestic animals, has been operating in their environment during the period these changes have occurred,' he said. 'This new factor is not far to seek.'

" 'That factor,' he continued, 'is DDT and its family.' "

Here are two stories which are bound to cause concern to the reader. We are, after all, using these new chemicals in our homes to kill flies, in our gardens, in our barns, and on our crops. And we are using other chemicals to kill weeds and rats and fungus. Farmers will certainly sympathize with the man who killed his herd—but they shouldn't be surprised at what happened. If he had fed his animals arsenic or sprayed them with prussic acid, no one would have been amazed at their death. No one should have been surprised that TEPP, a deadly poison, killed them, except that TEPP is a new chemical and not so well known. *The farmer could have avoided this tragedy if he had read the label on the insecticide.*

But why is such a dangerous chemical sold for farm use? The answer, oddly enough, is that TEPP, when it is properly used, is less dangerous than many insecticides because it leaves no residue.

It is the residual effect of DDT and some of the related chlorinated hydrocarbon insecticides such as lindane, chlordane, and methoxychlor, which makes them potentially dangerous. They remain active for a long period of time and they cling tenaciously to fruits, vegetables, and forage which has been sprayed: they also remain stored in the fatty tissue of an animal which has absorbed them through the skin or eaten forage which has been sprayed with them and they are secreted in the fat globules of milk. It is this stubborn, residual effect which has caused DDT and chlordane to be banned from the dairy barn: it is this same quality which has led Dr. Biskind to believe that DDT is guilty of undermining the health of man and his animals.

Dr. Biskind is not entirely alone in his belief, but there are few, if any, fellow scientists who will go along with him in this blanket condemnation. As one doctor put it, "Assuming that there has actually been an increase in the incidence of the diseases Dr. Biskind mentions — and I assume that there has been since there has been a considerable increase in our population since 1945—it is just as logical for

TEPP killed these cattle within minutes after they were sprayed to kill mites. The label, warning against direct spray, was not read.

me to say that the antibiotics are responsible, since they came into general use around that time. Or I could say that radioactivity was the cause since the first of a series of atomic explosions occurred in 1945 and there has been a widespread dissemination of radioactive material since then. As a matter of fact, Harry Truman became President in 1945 and I'm sure someone must have thought to blame him for the increase in these diseases during the last campaign.

"But to be serious," he continued, "these diseases are caused by agents which in most cases are well known. In the animal field, for example, take hoof and mouth disease. We had an outbreak of this disease back in the twenties before DDT was ever heard of and managed to stamp it out with a rigorous quarantine and sanitation program. In the past few years there have been epidemics of hoof and mouth in both Canada and Mexico, but in spite of all the DDT we've been using we haven't had a single case of hoof and mouth in the United States since 1929. Hoof and mouth disease is caused by a germ as is Vesicular Exanthema, the hog disease which was once confused with it. The recent outbreak of Vesicular Exanthema, which is commonly called VE, was caused by transporting the germ from the west coast where the disease has been known for many years, into the Midwest. Vesicular Exanthema, incidentally, was written up in *Keeping Livestock Healthy* — Dr. Biskind should have looked under E instead of V in the index. And speaking of his remark about the diseases which weren't mentioned in the book brings up Newcastle. We had Newcastle disease in America long before we had DDT, but the mild form of the disease was not diagnosed as Newcastle until after 1942 when we developed an embryo test for the disease. In fact all of the diseases mentioned by Dr. Biskind were known before 1945 except scrapie. This disease was identified in 1948. It has been found to be caused by a virus and will spread through a herd of sheep from the sick to the healthy without any help at all from DDT. As for blue tongue, insecticides certainly didn't start it since it has been present in Africa for as long as sheep farming has been carried on there, but insecticides may well bring it to an end. The disease is carried from sheep to sheep by small flies commonly called midgets, punkies, or no-see-ums, which harbor the disease-causing virus and spread it in much the same way that the anopheles mosquito harbors and spreads the malaria germ."

In the realm of human diseases, Dr. Frank Princi, who, in his capacity as Associate Professor of Industrial Medicine with the Kettering Laboratory, has examined many hundreds of persons exposed to poisoning by the chlorinated hydrocarbon insecticides of which DDT is one, said: "We have come to know a good deal about these organic insecticides, particularly DDT. We know that if they are absorbed through the skin or through the mouth in toxic quantities they will produce a fairly definite type of illness. This illness is quite distinct from any of those mentioned by Dr. Biskind. There will, of course, be an occasional person who will react differently, but that shouldn't confuse us. Let me put it this way. We know that morphine kills pain and we know that barbiturates cause sleep. Now there will be an occasional person whose pain will not be eased by morphine and there will be an occasional person who won't sleep after taking a barbiturate—but if ten people take a drug and continue to feel pain we know it isn't morphine and if ten others take a drug and none of them is put to sleep, we know it isn't a barbiturate. If none of the people show any of the symptoms of DDT poisoning, we can be sure that there is no such poisoning involved."

METHOXYCHLOR kills flies but is safe for cattle. DDT cannot be used on dairy cattle because it remains in the fat and is secreted with the milk.

The attack on DDT at this late date is rather surprising since there has been so much testing and checking of this particular insecticide. Contrary to statements made by some of the more sensational writers, DDT was thoroughly tested before it was released for public use. Testing of this Swiss discovery was started in the United States early in 1943. In that momentous year, incidentally, our troops in New Guinea and the South Pacific were suffering greater casualties from mosquito-born malaria than they were from the jungle-wise Japanese troops. At the request of the Surgeon General of the Army and other agencies of the government, tests of the toxicity of DDT to mammals were conducted by the National Institute of Health, the Food and Drug Administration, the Kettering Laboratory, the Chemical Warfare Service, and a number of university laboratories. These broad studies covered the danger of the chemical when taken orally, when breathed as a dust or spray, when it came in contact with the skin, and the dangers of preparing and mixing it. Other aspects of the problem were studied by the Department of Agriculture, the Fish and Wildlife Service, the Navy, and several private laboratories.

These tests were not designed to find out whether or not DDT was poisonous. It was clearly recognized that it was. As a matter of fact any chemical is poisonous at some level of concentration and any chemical which we normally think of as a poison is nonpoisonous at some level of dilution. The tests in 1943 were designed to find out what the dangers were and at what levels of concentration the chemical could safely be used. If it had been found

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The Progressive Farmer

By Hugh Orchard

Pap was what today we would call a progressive farmer. He bought the first windmill in our neighborhood and invested in the first blooded bull. He had the first twine binder and the first top buggy. He put up the first barbed-wire fence and tried out the first woven-wire picket fence. He was the first to use tiling for draining of wet places in the fields and once went a hundred miles to buy a road cart which was the first one any of our neighbors had ever seen.

He was the first to plant Osage hedge for fencing and the first to dig it out when it didn't work. He had the first hay carrier and our old Brown corn planter was one of the early ones. He bought the first sulky rake and the first sulky plow. Some neighbors made slighting remarks about any man who had to ride while he plowed, but Pap only laughed and let them keep on walking.

He was the handiest man about doing things. His ax handles were so good that our neighborhood giant, Joe Mussack, had Pap make the extra strong ones he had to have. Pap was a fine carpenter and the best wood chopper in the neighborhood. He doctored all the sick animals on our place and got called to help with the sick stock on neighboring farms. He grafted fruit trees, crossed varieties of plants and vines; knew cures for snake bite and ivy poisoning; and spayed, castrated, caponized and did other kinds of animal doctoring. No one had taught him these things, he just seemed always to know how.

Sometimes, however, he guessed wrong about a critter's ailments or prescribed the wrong remedy. One winter we had an epidemic of hog cholera and the animals were dying by the dozens. First they would lose their appetites, then they would have the cramps and a hoarse cough. Soon after this they would die. Pap had a fine barrow that quit eating for a day or two, and developed a bad cough. We put him in a pen by himself and waited for the inevitable.

That Saturday night in town all the farmers were talking about the cholera

epidemic. Luther Talbot said that down in the Jim Linder neighborhood the farmers had cured their sick hogs with tobacco juice. Chauncey Blodgett, who never used the stuff, agreed that it ought to be good for something. Pap said little but he was taking in all the comments about the tobacco cure.

Early the next morning Pap went to work. He cut a plug of Horse Shoe into little squares and Mother boiled them for half an hour in an iron pot on the kitchen stove. As soon as the water got a good rich color he poured it into a long-necked bottle and we all went down to the sick hog. The older boys hung onto the barrow and Pap pried open his mouth and poured every bit of the mixture down the hog's throat.

As soon as the boys let him go, the hog staggered into a pile of straw, keeled over on his side and began to tremble as if he were having a chill. Pap put a horse blanket over him but he shook worse than ever. Inside of ten minutes he straightened out to full length and settled down as quiet as a stone. It was all over and the prize hog was dead, dead as a door nail, dead as Pharoah—dead from a dose of tobacco poisoning big enough to have put twenty hogs out of business.

Pap never let on like anything had gone wrong. He just turned to us and said: "Well, he didn't die of cholera, anyway." And he was certainly right about that!

Then there was the horse named Shug. Shug never was healthy. He was an off-looking animal, too. His feet were as big as half-bushel measures and usually split badly. His hair never shed like other horses but hung in stringy wisps. He had great big ugly lumps under his belly and nearly all the hair came out of his tail. In spite of all his bad luck, however, he grew to be a big, bony horse and furnished Pap with every excuse to practice his home remedies.

When Shug was about six years old he fattened out and shed his surplus hair. Pap put him in a box stall in the barn and intended to sell him to the first person making an offer. But then Shug got sick again and began to look bad.

PRAYER and persistence got young Hugh Orchard out of a hole when he jimmied the knotter on his father's new binder.

About the same time Pap had bought a new force pump, fifty feet of garden hose and a nozzle that could squirt water to the top of the house. One day Pap got the idea that we ought to try squirting Shug with the new equipment. After the treatment we turned poor Shug loose in the apple orchard but he just staggered behind a haystack and collapsed.

After supper, when I started after the cows, I went past that way to see how Shug was getting along. He was lying close against the haystack, stretched out like he was asleep. I went up and gave him a little punch, but he didn't budge a bit. He was asleep, all right, and he never woke up either. It took us all working steady 'til almost bedtime to dig a hole big enough to bury him. But we finally go it done, rolled Shug in and covered him up for good and all.

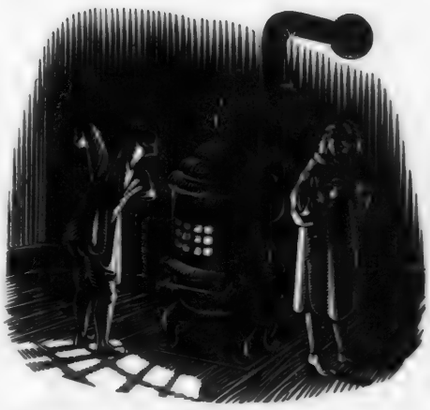
Pap said we had overdone the pump treatment. But we kids never could see, for the life of us, how we could be included in the blame. Pap gave all the signals—all we did was to work the pump handle.

We didn't always come out so well with new machinery, either. Pap had bought a Minneapolis twine binder, the first in the neighborhood, and folks came for miles around to see it cut and bind the grain. Pap took a great pride in it, for it was a wonderful looking machine, almost as big as a thrasher, and cost $250. At the end of harvest that year haying was right on top of us, and Pap left that new binder out in the apple orchard for a few days before he put it in its shed. Boylike, I had to do some tinkering with that binder.

Whenever I got a chance, and nobody was watching, I would pull down the twine in a loop about the size of a bundle, trip the trigger and turn the binding apparatus over, and watch the little thingumbob grab the twine and tie it in a chicken-head knot. I bet I did that more than a hundred times during the two or three days the binder sat there. I hid the twine I was wasting in a half-caved-in old well down by the Jack barn.

I made a careful study of the cog wheels that ran along one end, and wondered just what each one had to do with the operations. Finally, my curiosity got the best of me, and I pulled the cotter key and slipped one of the middle cog wheels off to see whether the binder would tie a knot without it. But when I had the handles about half way over the whole thing locked itself tight and refused to go on or go back. I shook it, and wiggled it, and tried to force it, but all to no use. There it was. I had ruined it—and had Pap to deal with when he came in from the field!

The first thing I thought of was to run away. Then I decided to deny all knowledge of the happening, and stick to it. Then I remembered that Mother and one of my sisters had seen me monkeying with that binder, and had told me a time or two that I had better leave it alone. I was



THE BEDROOMS in the Orchard home were unheated. It was a privilege to undress in front of the heater in the living room.

in an awful fix. All I could do was to wait for developments and take whatever came.

The men came in to dinner, ate, rested a while, and went back to the fields without noticing a thing. That evening they walked right past the binder, doing the chores, but never paid the least attention to it. And there stuck both handles straight up in the air. Anybody should have noticed that they didn't belong that way!

This went on for a couple of days, when there came a lull in the field work and Pap called all hands to help roll the binder under its new shed, and put up the heavy door. I felt something give way in my insides, and I had the hardest kind of a time to get my breath. But I went along with the men, because I couldn't get out of it.

A mole had thrown up a little mound of fresh dirt right in the path, and the men all stopped to look at it, and that gave me a chance to get to the binder first without being noticed. There was a gunny sack lying there that twine had come in and, quick as a flash, I grabbed it up and threw it over the binder handles. That saved the day for me, I am just as sure as can be. Not a soul noticed it and in a few minutes the binder was in its shed with the big door fastened shut.

For the first time in three days I breathed easier again. The sun shone, the birds sang, food tasted better. Life was again worth living. It would be a whole year before anybody saw the binder again, and I would have all that time to get it put back together again. The exodus of the Children of Israel from Egyptian bondage couldn't have meant any more to them than this escape did to me. It wasn't the fear of a flogging so much as that sneaking feeling you have when you get caught in some kind of devilment. That was where the shoe pinched the worst. If there is any worse feeling than that I never found out what it was.

In a week or so I got a chance to slip into the shed without anyone seeing me. But it was the same old story—everything locked as tight as a drum. A few days later I got another chance, but again

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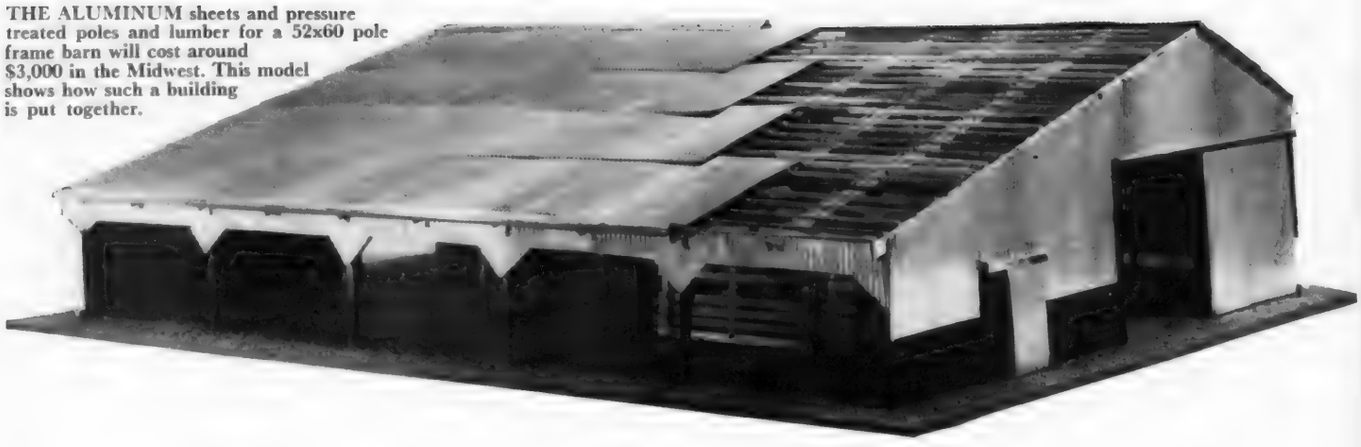


THE ALUMINUM sheets and pressure treated poles and lumber for a 52x60 pole frame barn will cost around $3,000 in the Midwest. This model shows how such a building is put together.

How Practical are METAL BUILDINGS?

By Charles R. Koch

FARMERS everywhere are asking about metal buildings. Lumber in many sections is a rare and expensive item; labor for construction runs costs way up. This is the age of metals and the men who have valuable livestock and machinery to protect want to know how to use these materials to construct better, less expensive, more efficient buildings.

Like anything else, you get what you pay for in a metal barn or machine shed. A prospective builder must keep in mind that a metal building is only as good as the metal that goes into it and the care used in planning it. Unprotected iron and steel are easy prey to rust; metal construction demands special techniques to make a building leak-proof; and condensation is one of the bigger problems. But the metal building fabricators have had some of the best engineers in the business at work on these problems and they have come up with most of the answers. The question is, have they actually succeeded in making the metal building a farmer's project?

Harry Kolb would definitely answer "Yes." Kolb and his brothers operate a half dozen farms strung out along the Indiana-Ohio line north and south of the border town of College Corner. It takes a lot of machinery to cater to the hundreds of head of cattle and hogs they set table for, and Harry is a sensitive kind of fellow who can't stand to think of all that expensive equipment standing out in the rain and snow. He did some shopping around and in the summer of 1952 decided that a Gothic arch type steel building, 40 x 56 feet was just the thing. Today he is still happy with his decision. This in spite of the fact that galvanized metal was unavailable at the time he bought. He painted the untreated corrugated sheets with an aluminum paint before construction and has never been bothered with rust.

Kolb's son, then in high school, put in the concrete footings, set the anchor bolts as directed in the blueprints; the framework fit perfectly and went up without a hitch. This building was constructed on factory welded arches 22½ feet high set 8 feet apart, with a clear span of 40 feet.

After the framework was up, the 24-gauge sheets, 26 inches wide and 8 to 10 feet long, were bolted to it with a 2-inch overlap. Three men put up the framing in a day and a half. The siding and roof went on mostly in spare time during the following weeks, so that the actual time to finish the job is difficult to estimate. "There was one day, though, when we worked steadily," Kolb says, "and four men were able to cover one side completely with the exception of three or four plates."

The concrete floor and foundation cost Kolb about $500 and the metal for the building, including 14x14 sliding metal doors on each end would cost $4,678 f.o.b. factory at this time. Prices were a little lower when Kolb did his building, but the current price includes a special baked-on finish that eliminates the need for painting. At this figure the cost per square foot of machinery storage space figures out to about $2.09, exclusive of the floor.

In contrast to Kolb and his happy experience is another farmer we'll call Smith. Smith is a real person who doesn't want to be called a sucker by his neighbors. He has almost $13,500 tied up in a beautiful looking 40x88-foot barn which he wishes he'd never seen—all because of a poor batch of metal, a bad paint job, and lack of careful planning.

Smith had a fire in the summer of 1952 and he needed something in a hurry to house his beef and dairy stock and get his hay under cover. That's one of the nice features of a prefab metal job. You can order it right out of a catalog; the parts are all cut to fit and ready for erection and it goes up in a hurry. But this can have its drawbacks, too. If a man tries to cut too many corners to save time and money, he is likely to buy himself a series of headaches. That's what happened to Smith.

All metal building fabricators advise a

base of wood or concrete three to four feet above the floor in buildings that are to be used to house livestock. Manure has a devastating effect on metal and rambunctious stock can bust out a plate with a good kick. Smith claims the salesman told him it would be perfectly all right to bring the metal right down to the floor. Now he is sorry he did.

The next headache came on when the finish began to sluff off. This building was a product of the dark days when there was no galvanizing available. The fabricator of Smith's building was experimenting at that time with a baked-on finish for which it had high hopes as a lifetime job. Smith bought it as such. "But when it rains it looks like somebody was pouring milk on the barn," he laments. "The stuff washes right off." Actually, this process has now been perfected and is turning in good results, and to the credit of the manufacturer, Smith got a complete and extensive paint job this spring for free.

Then there was the matter of condensation. There is bound to be condensation of moisture in any building in which livestock are kept. When the temperature on the outside falls below that on the inside, the warm inner air deposits its moisture on the cold, inner surface of the walls and roof. This will happen in a frame building as well as in a metal building; but wood is something of a self-insulating material and it is also able to absorb some of the moisture. In a metal building the moisture runs down the walls, rusts the unprotected metal, and makes life uncomfortable for man and beast.

This problem can be solved with proper ventilation and insulation. But Smith had too little of both. He ordered only four roof ventilators for his barn. Hindsight proves he should have used more. Then he made the entire east end of the building into a stanchion barn for his dairy cows, sealing it off from the rest of the barn without any access whatsoever to any of the ventilators. That was asking for trouble.

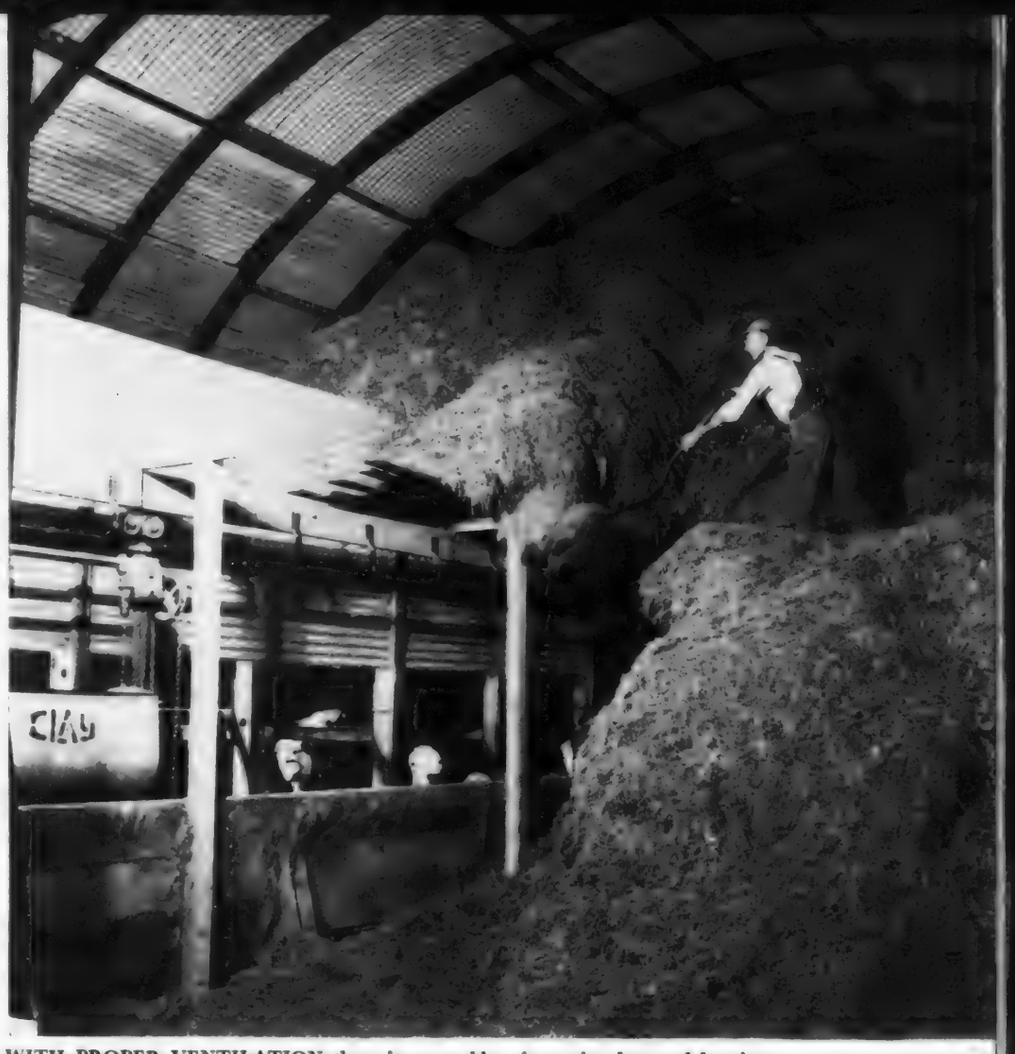
Finally, Smith saved himself about $200 by substituting a small 3½-foot entry door in the side of his cow stable for the big double door he might have had. Again, much dissatisfaction.

Smith's experience goes to show that it pays to take a long look before you invest in a great, big, beautiful hunk of metal.

But Metal is Good

Metal is a new building material for the farmer. When he learns how to use it, he will find it superior in many respects to the wood he has been using down through the years.

Metal can't be worked like wood. The ordinary farmer not only lacks experience in working with metal but he is equally unmindful of its peculiar quirks. He is apt to discount its tendency to sweat, or fail to take into consideration the fact that he had better keep it up out of the manure



WITH PROPER VENTILATION there is no problem in storing hay and housing livestock in a metal building. This Iowa feeder converts his quonset-type barn to machinery storage after his cattle have been marketed. The patented construction used in this building permits fastening the sheets to the framing with nails.

CLEAR SPAN, columnless interiors are one of the big features of metal framed buildings. Translucent plastic sheets in the roof provide plenty of light and are cheaper and more easily installed than conventional windows. Side windows, louvers and roof ventilators provide ventilation in this barn.

and protect it from violent contact with the stock. That is why the manufacturers insist that a metal building should be bought in a package deal, like a tractor or the family car. Don't buy the parts, they say; buy the whole works carefully engineered for the job it has to do and you'll be satisfied. Many of them also urge that the farmer avail himself of the services of a trained and experienced erection crew to put up the building.

Steel and aluminum are the metals presently being used for farm buildings. The steel comes in sheets, either corrugated or crimped, much like those that have been used for roofing ever since grandfather's day. These sheets are of varying sizes, the average being about 26 inches in width and 8 to 10 feet long. They are generally of 24-gauge metal and are usually galvanized. At least one manufacturer is now coating its sheets with a siliconized paint that is baked on. Indications are the finish will be good for the life of the metal. In most instances the sheets are attached to the metal frame by bolts, though one fabricator uses a clip and wedge type of assembly while another has a method that permits nailing the sheets to the trusses.

The aluminum sheets are of 24-gauge metal, corrugated and embossed for greater strength. They come in 26 and 48 inch widths and in lengths from 6 to 12 feet. Their recommended use is in a pole type of construction with aluminum nails being used to attach them to the framing. One of the features of aluminum stressed by the manufacturers is its reflective quality, which is a big factor in keeping the interior of a building cooler in the summer and warmer in winter.

Metal building manufacturers keep their engineering departments busy devising more efficient methods of controlling condensation in their structures. Proper ventilation is the cheapest and most practical means. Insulation can be used—anything from the paper-thin reflective aluminum to the board types and loose types of materials—but this can often run into considerable money and in many buildings the application presents a special problem. So the engineers generally recommend staying away from insulation unless it is needed to control temperature as well as condensation.

Exhaust fans are another potent weapon in the battle with condensation. These can be installed in one or both ends of the building and will be a big help in carrying out the moist air. They are usually powered by a ¼ horsepower electric motor. The most popular sizes are 16, 20, and 24 inches. One company offers these three sizes with duct and shutters included for $144, $160, and $170, respectively. Without duct and shutters they sell for something like $60 to $100.

The matter of size is determined by the size of the building, it tightness and the number and kind of livestock. For a stall type dairy barn the fans should be able to move anywhere from 30 to 120 cubic feet of air per minute per 1000 pound cow. Manufacturers and their representatives are best qualified to translate these requirements into fan sizes.

The first cost is usually the last for a fan aside from the electricity it uses. A greasing once a year should keep it in operation indefinitely.

A Kind for Every Job

There are several basic types of metal barns and utility buildings. There's the rigid frame, factory welded type of building which has already been mentioned. This job goes up in eight-foot sections and it is very simple to figure what one will cost. What the factory calls the "starter" bay for the 40-foot building costs exactly $600 at the plant. This includes two trusses, purlins, trim and sheets to cover 8 feet of building. It does not include end walls, doors or windows. Each additional 8-foot bay sells for $400, and the solid end walls are $491. That is the basic building. Variations in cost for buildings of identical size depend upon the buyer's selection of such items as doors, windows and ventilators. Sliding end doors cost from $300 to $450 each, entry doors, $70 to $95, windows $35 to $100, the dormer type being more expensive, and rotary ventilators are $48.75.

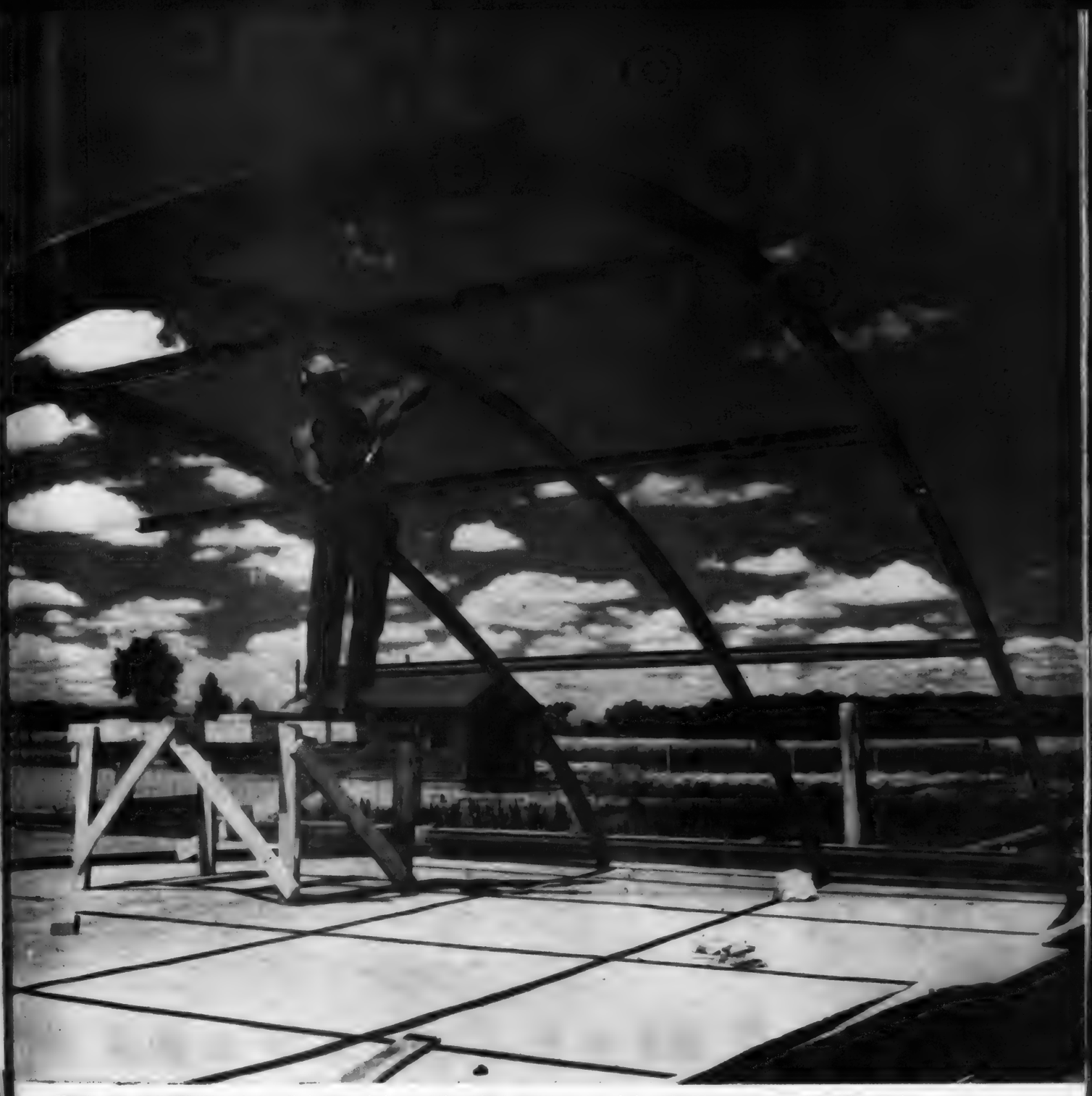
This building is bolted together, the holes for the bolts all being punched at the factory and each bolt is fitted with a weatherproof washer.

Another manufacturer makes a rigid frame, gable type building very similar to this. It is fabricated in bays of 12 and 20 feet with sidewall height from 8 to 14 feet. One of the most popular of these is the 36-foot model with 12-foot sidewalls. It has 12x12 doors in each end, a sidewall door up to 20 feet in width and 12 feet high, and a standard walk-in door. The cost of this building with two sliding doors runs about $1 per square foot of floor space, f.o.b. the factory in Illinois. This is another building that is bolted together throughout.

The Quonset-type building became a byword in military installations during World War II and is now proving itself as good a work horse as it was a war horse. As every ex-GI knows this is an arch roof type, the arch being a half circle. Unlike most of its competitors, it is not bolted together. It is built on steel ribs four feet apart, each of which has a nailable groove inside and out. The corrugated steel sheets are nailed to the ribs with special nails supplied with neoprene washers to insure against leakage. These buildings are designed in 20-, 24-, 32 and 40-foot widths. They are particularly popular in sections where wind pressures and snow loads are a hazard. Prices of these buildings range from 90 cents to $1.25 a square foot, depending on model, size and accessories, such as doors, windows, and ventilators.

The Quonset is a very tight building, making it particularly necessary to give some thought to ventilation or insulation to whip the condensation problem in struc-

THE CLIP AND WEDGE type of construction used in this machine shed eliminates the use of bolts and nails. Such a building can be extended to any desired length as future needs arise. The open front is not only an economy factor but allows easy access to every piece of equipment.



SPEED OF ERECTION and the elimination of the need for skilled labor are two of the points stressed by metal building fabricators. Once the footings are in, the job goes in a hurry. Screwdriver and wrench are the basic tools and there are no delays in running to town for various items that may have been forgotten in the original order. All parts are delivered in a package deal.

tures such as stall-type dairy barns that will be closed most of the time. Besides ventilators, the manufacturers recommend insulation and the use of fans to remove the excess moisture.

Insulating a quonset is a comparatively easy job, because the insulating sheets, if a sheet type is used, can be nailed right to the ribs. If a loose material is used it can likewise be applied behind boards nailed to the ribs.

A recent variation on the arch roof type building is one in which the truss has been eliminated entirely. This has very modestly been dubbed the "Wonder Building" by its manufacturer. Made of 18-gauge galvanized arched steel frames 2 feet wide, it can be built in widths from 20 to 100 feet and extended to any desired length. Prices run about $1.10 per square foot of ground covered, f.o.b. Chicago.

Clip and Wedge

One building fabricator has completely eliminated the use of bolts and nails in its structures by the use of a very clever clip and wedge assembly. These buildings are of box corrugated galvanized steel. Each sheet has a series of clips that are fitted through corresponding holes in the overlapping sheet. Metal wedges are then driven through the clips, locking the sheets together, and the same method is used to attach the sheets to the structural parts. It is a very interesting application of the old, familiar principle of the hasp and wedge. These buildings come in 26-, 30-, and 40-foot widths and 10, 12-, and 14-foot heights.

Aluminum

The aluminum people have been sitting back carefully taking notes on the problems of the steel fabricators and the progress they have been making. Their care-

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Fire Stoppers

A fire extinguisher in the right place has saved many a farmhouse and barn

By Ellis Rawnsley

PROFESSIONAL firefighters say that every fire starts out as a little one, and that what happens in the first five minutes of its life determines whether it's going to develop into a conflagration.

That's the reason for fire extinguishers. It's a reason especially sound for farmers and their families, living as they do in areas usually remote from fire departments, and surrounded as they are by buildings, often frame, filled with flammable substances and by fields and forests, tinder-dry during parts of the year.

A fire extinguisher, within easy reach when a fire first starts, will save many a house or barn. No farmer would think of being without fire insurance; no insurance is as cheap or effective as an extinguisher ready at hand in house, barn, and shed and on every piece of gasoline powered machinery.

Rollcall of Extinguishers

Unfortunately, no one type of fire extinguisher will handle all types of fires, and adequate protection around the farm calls for at least two of different types.

Generally-speaking, water still is the best, handiest, and cheapest fire quencher there is, although it has serious limitations. It should never be used on a fire involving live electrical equipment, because water is a conductor of electricity and the user could be hurt or killed by shock. It shouldn't be used on grease or oil fires, because water will only spatter the oil or grease and spread the fire instead of putting it out. (The fine, high-pressure fog which fire departments use is good on oil or grease and fairly safe on electrical equipment as well, but that's not home equipment by any means. A good fog calls for 100-125 pounds of water pressure and specially-designed nozzles—to say nothing of training in its use).

Where there is a constant water supply under pressure, there's no better fire extinguisher—within its limits—than a small hose that can be snapped quickly on the nearest faucet. A small, steady stream of water will knock down an astonishing amount of fire. Professional firemen put out most of their fires with the small line that is carried on a reel on the fire truck, and those lines use nozzles that throw no more than a quarter-inch stream, and often smaller.

Where reliable water pressure is available, one manufacturer puts out a special hose, with nozzle and shut-off valve, stored in a small cabinet. The hose is made of linen, which has a life of about 20 years, whereas rubber hose will dry and break down in much less time, particularly if it is folded and unused. A basic outfit—50 feet of ¾ inch hose, nozzle, shut-off, and cabinet, runs about $35. More hose can be added. It should be pointed out that when water is first turned into linen hose, it will leak all over the place until the linen is soaked. That's a characteristic and nothing to worry about, for the leakage soon stops.

Lacking water lines, pump tanks are almost as handy. The usual size holds five gallons. The type widely distributed for civilian defense during the Second World War sometimes can be picked up in surplus stores for about $2. With steady pumping, one will throw a stream of water some 30 feet, and a bucket brigade can keep it going. A new one will cost about $4.50. Most fire departments carry pump tanks designed for back carry, with a pump worked like a trombone. Such a tank carries five gallons, and has two nozzles, one for a solid stream and the other for a spray useful for wetting down an area in a grass fire, for instance. A galvanized metal model good for a few years will cost about $11.50. Better, of course, is a brass tank costing about $16.

Something new in fire-fighting is "wet water." It's just water with a form of chemical detergent added that—to put it in technical terms—breaks down the surface tension of the water. Ordinarily, water tends to form into drops and hang

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	Carbon tet	*Soda Acid*	*Foam*	*CO2*	*Pump Tank*	*Dry Chemical*
Most common size	1 quart	2½ gallon	2½ gallon	15 lb.	5 gallons	15 lb.
Operation	Pump	Invert	Invert	Open valve	Pump	Open valve
Maintenance	Inspect for leakage or stoppage	Recharge annually	Recharge annually	Weigh to check for leakage	Keep full	Weigh cartridges annually
Conductor of electricity	No	Yes	Yes	No	Yes	No
Time to empty	Rate of pumping	1-1½ min.	1-1½ min.	1-2 min.	Rate of pumping	10-25 seconds
Freezing protection	No	Yes	Yes	No	Yes	No
Range	20 feet	30 feet	30 feet	8 feet	30 feet	10 feet
Extinguishing effect	Smothering by gas	Quenching	Smothering by blanket of foam	Smothering by gas	Quenching	Smothering by gas
Effect on Class A fires*	Poor	Excellent	Fair	Poor	Excellent	Poor
Effect on Class B fires*	Fair	Poor	Excellent	Fair	Poor	Good
Effect on Class C fires*	Good	Poor	Poor	Excellent	Poor	Excellent

* Class A: Ordinary combustibles such as wood, paper; Class B: oils, grease, paint; Class C: electrical equipment.

WEANING EARLY eliminates runt problems and poor doing when the sow's milk declines.

The Adolescent Pig

By W. N. McMillen

A PIG no sooner passes the first hurdle of his life, birth and babyhood, than he faces the second, weaning and adolescence. That comes sometime after he is five weeks old, when he must face the world without his mother's milk.

Weaning is a big adjustment, and must be made carefully. Unless one takes care, a pig may go bad at this point, become stunted, and even sick within a few days after weaning. The period between weaning and 60 pounds is a special transition period when he is being prepared for the feedlot. During this time we are shifting the pig from a complete starter feed and heated protected quarters to free-choice corn and supplement and the grim out-of-doors.

We hear a lot today about getting a pig past the first hurdle, that of saving him at birth; most hogmen agree their biggest worry is to keep from losing small pigs the first three days. Then comes the lesser task of teaching them to eat fortified pig starter early to keep them gaining. A bigger problem, often overlooked, is the big loss due to stunting and wasted feed on pigs that go bad after weaning.

Many hogmen feel like Ken Ruck of Macon, Illinois. The other day Ruck said, "It makes you feel good when you get them up to 3 weeks of age like this bunch —fat, sleek, and eating starter." To get his pigs past weaning without a set-back, Ruck has three simple rules: (1) A complete fortified feed, (2) all the fresh, clean water they can drink, and (3) make them comfortable.

Fortified Complete Feed a Must

Ruck and his partner, Howard Glawe, just got through weaning 109 pigs from 13 litters. The pigs at five weeks, except for a few tail-enders, averaged 21½ pounds. Three weeks later they were up to 40 pounds. This is as good or better than they would have done if left on their mothers for the full eight weeks.

The pigs were fed a commercial pig starter pellet that cost $5.25 per cwt. and required 2.04 pounds of starter per pound of gain, making a cost of 10.7 cents per pound of gain. By using a fortified pig concentrate and grain for a few of the pigs, the cost was 9.3 cents per pound of gain.

At first sight this cost seems to be too high. With corn worth just under 3 cents a pound, it is impossible to put together anything like an adequate ration for less than 4 cents a pound. Then it usually takes 2½ to 3 pounds of feed in meal form for each pound of gain. So, 9 to 11 cents a pound is not out of line.

After figuring these costs, Ruck says, "What if these fortified starter pellets do

increase the cost a cent or two a pound for these three critical weeks? We can't afford to take a chance on these pigs going bad, getting necro or scours."

He is right! A cent or two extra per pound cost for insurance looks cheap when one realizes that for every pig that dies after weaning, the feeder has lost 250 pounds of feed plus the profit that he would have made on the pig. Then, too, the pigs that remain runty for several weeks will continue to eat feed, but gain very little. So keeping pigs gaining for the 3 to 6 critical weeks after weaning means getting them to market from one to three weeks earlier.

There are many commercial feeds on the market for the adolescent pig. They are balanced and compounded scientifically, a complex job that the farmer is rarely equipped to do. For those who mix their own feed the following, based on a formula developed by Dr. John Lasley, of Missouri, is one of the best and has been used successfully in the feedlot. Its ingredients are essentially the same as go into most commercial feeds. The man who wants to mix his own may have difficulty in obtaining some of the ingredients, and unless he is a big operator, would have to pay retail prices. It is doubtful if he could mix his own at a cheaper price than he could buy the ready-mixed article. Here it is:

Ground yellow corn	1435 lb.
Meats scraps or tankage (50-60% protein)	200
Wheat shorts or middlings	100
Minerals*	40
Cod liver oil**	10
Antibiotic supplement***	10
B-vitamin supplement****	5

* Equal parts of steamed bone meal, ground limestone and salt. ** 100 lbs. (or 5%) ground alfalfa meal can be substituted for the cod liver oil. *** Containing 1.8 grams of aureomycin and appreciable quantities of vitamin B_{12} per pound of supplement. **** Containing a minimum of 2000 mg. of each of the vitamins, riboflavin, pantothenic acid and niacin per pound.

At the present price of corn, this would cost about $72 per ton, bags and mixing not included.

Antibiotics, arsenicals, vitamins and a better knowledge of swine rations have decreased weanling pig troubles during that in-between period between weaning and fattening. There are still too many pigs, however, that don't get these "trouble shooters," or they may go bad from poor management even if the ration or feed mixture is okay.

One big mistake is to start free-choice feeding of grain and concentrate too soon.

When their pigs averaged 40 pounds, Ruck and Glawe put them in a comfortable shed. They started feeding corn and pig concentrate free-choice. The top end of the pigs continued to gain normally, but several smaller ones just about held their own for two weeks. This happens time and time again on Corn Belt farms. There is no question that starting free-choice feeding of pigs soon after weaning often results in the tail-enders become runty.

"On our next bunch we're going to try something different on those tail-enders," Ruck says. "We'll feed fortified pig concentrate mixed with coarsely ground corn until the pigs weigh at least 60 pounds. We can do this for a feed cost of less than 10 cents a pound."

Careful feeders can make the change from complete feed to free-choice feeding when the pigs weigh less than 60 pounds. One must be careful, however, that the change is made gradually. One way to do it is to put concentrate and grain in one feeder right beside the feeder that contains the pig starter pellets or pig starter meal. The same thing can be done by putting corn, concentrate, and starter in 3 separate compartments of the same feeder. The whole idea is to be sure the pigs are eating some concentrate along with the grain before the pig starter is taken away.

Jim Rankin of Monticello, Illinois, licks this change-over problem by keeping a mixture of 6 parts of oats, 4 parts of corn, and 2 parts of pig concentrate in one feeder and shelled corn in another. The pigs continue to eat more of the ground grain-concentrate mixture for the first few weeks, but change more to corn as their protein demands become less.

A complete mix at this period is gaining in popularity among hogmen. Pigs can be weaned after they are 5 weeks old, or when they weigh 20 pounds, provided they get a complete fortified pig pellet or a fortified concentrate mixed with the grain. The complete feed should be continued until the pigs weigh 60 pounds at about 11 weeks of age. It may be a problem to get pigs used to grain and concentrate free-choice before the starter is discontinued, but it is undoubtedly a sound thing to do.

How About Weaning Pigs Early?

More and more hogmen are weaning their pigs early. Even with good starter feed available, pigs often tend to spend too much time pulling on the sow and depending on the diminishing supply of milk. The small amount of milk the sow usually gives after the pigs are 5 weeks old is costly. Most sows, during this period, will eat 12 to 15 pounds or more feed daily. This big feed intake makes the diminishing amount of milk come pretty high. Then, too, pigs often get injured in running with the sows during this period.

A number of swine producers got on to early weaning when they had younger pigs to wean along with pigs that had reached 8 or 9 weeks of age. They found

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ONE OF THE MUSTS for the adolescent pig is a supply of fresh, clean water. Running water, or one drinking cup to 20 pigs is recommended.

THE DELIVERY HACK was standard about the turn of the century. It was a tight, weather-proof box with sliding doors. This one operated out of Crawfordsville, Ind. Carriers at this time wore an unofficial heavy, blue-gray uniform and cap.

R. F. D.

W. LEVI CLOUGH, rural mail carrier, Queen Annes County, Md., saw the red flag up on the Enoch Sloan box. He stopped his horse at the box, opened it, and took out an alarm clock, with a note attached. The note read: "Pa's watch stopped. Will you please set our clock?"

It would appear that delivering mail to 34,000,000 people would be a big enough job for our 32,546 rural mail carriers without the added duty of setting clocks. But to the families lined up along the thousands of miles of rural routes in this country, the mail carrier is just another neighbor, willing and glad to help out with little favors.

The carriers themselves feel the same way about it. The service has a fine tradition of helpfulness and neighborliness back of it, built up during its relatively short life. The rural mail delivery service will observe its fifty-eighth birthday this year.

It all started back in the middle 1880's when a pert little farmer's wife got to her feet in a Grange meeting out in the Grand Prairie region of our Midwest and complained bitterly about having to drive eight miles over bad roads for the mail. "People in the cities have their mail delivered to them," she said. "Are they any better than we are; why can't we have a rural free delivery?"

The idea swept the country like a fire on the Grand Prairie. Politicians were quick to see its virtue as a rural vote getter. By 1891 there was sufficient pressure back of the idea to induce Postmaster General Wanamaker to suggest a bill in Congress to create such a service. The bill failed, but the next year Congress appropriated $10,000 for an experimental rural delivery route. Mr. Wanamaker was annoyed at the stingy appropriation and stated that it was inadequate for a full exploitation of even an experimental route. The appropriation was on an annual basis and by 1896 enough had accumulated to justify a start.

On June 9, 1896, the first R.F.D. route was started at Charles Town, West Virginia, and a little later in the same year two more routes were established in the same state. The service spread like the green bay tree. Today there are 32,546 routes which serve nearly 34 million individuals.

The name, Rural Free Delivery, is a misnomer, and although it was used officially for a time, the "free" was dropped in 1903, no one knows why. The official designation now is simply Rural Delivery. It is not now, and never was, free.

Rural mail carriers are a race apart. Theirs is a lonely life. They go their appointed rounds, day after day over the same routes, with no company but their thoughts. They watch the snows of winter melt off the hillsides, the tender green of

CLAUDE UNDERWOOD, Magnolia Springs, Ala., has an all-water route, 22 miles long.

spring appear, merging into the lush summer and then into the painted autumn. They get to know every stick and stone and puddle along their piece of country highway. Some of the people along their routes remain only names on the mailboxes; others, as lonely as they, become friends and neighbors, coming to the end of the lane in sunbonnet and apron, to exchange a few words with the outside world. They see children grow up and become fathers and mothers and then grandparents. From the very nature of their duties they become helpful neighbors, and their chores stretch beyond their official duties of carrying the mail, making out money orders, selling stamps.

W. Levi Clough, who set the clock, has been carrying the mail over the same route for 47 years. His total mileage would reach 20 times around the earth. He wore out more horses and buggies than he can remember, and 9 automobiles. For thirteen years after he started his route in 1916 he drove a horse. Sometimes, when the bottom fell out of the dirt roads in winter, he rode horseback, taking shortcuts across the fields. A runaway horse once dumped him, with all his mail, into a wet ditch. He once wrote a letter for an illiterate farmhand to his best girl. The letter, a proposal of marriage, was so convincing she said yes.

The postoffice department learned very early that it could not restrict the extracurricular activities of its mail carriers. There are a few things they cannot do—they cannot solicit on their routes, and they cannot make deliveries for business firms. But there is nothing in the regulations to prevent them from matching a spool of thread for a patron or stopping at the blacksmith shop for a sharpened plowshare. They have delivered babies, put out fires, helped round up strayed livestock, taken splinters out of fingers. Walter Hansen, of Vermont, found this note in a box: "Will you please stir my applebutter. I'm taking Lafe his dinner."

The telephone, radio, and daily paper have not seriously threatened to displace the mail carrier as purveyor of news, rumor, and neighborhood gossip.

The hazards of driving more than a million miles would seem to be a strain on the law of averages. Yet John Stansbury, who has carried the mail in Vermilion Parish, La., for 32 years, has never had an accident—"never even bumped into anyone," he says. The carriers have a remarkable safety record.

The department permits carriers to operate sideline businesses as long as they do not interfere with the delivery of the mail. Stansbury has a little farm, gets up at 4.00 o'clock, feeds his stock, and goes to the postoffice to sort his mail. He says that he always looks forward to his daily 30 mile drive, for like all carriers he believes the people along his route are the best. "Why," he says, "I'm always finding a bunch of new onions or a length of sausage at butchering time, or a cup of hot coffee on the cold days."

If a carrier wants to stop and chat, there's nothing in the regulations to prevent it. He is not confined to a time schedule, but is expected to cover his route regardless of storm or heat or cold or gloom of night. If he finds a bridge out, he is permitted to take alternate roads, but otherwise he cannot take short cuts even though he has no mail to deliver.

When the service was started in the late nineties the routes were shorter than they are now. Up to the early 20's routes were laid out on the basis of the distance a cavalry horse could walk in 8 hours. As automobiles replaced the horse, the length of routes has been increased. Very often when a carrier retires, his route is combined with another. The longest route today, 104.1 miles, is out of Edinsburg, Texas. The shortest is out of Robbin, Ill., and is 6.25 miles in length. The standard route is 30 miles, and it is on this length that the basic salary is computed. The first carrier was paid $200 per year. Through the years the salary has been gradually increased. Today the maximum salary a carrier can draw is between $4,000 and $5,000, depending on the length of service, length of route, and the population served. He furnishes his own car, but is paid depreciation and maintenance. Carriers are required to retire at the age of 70. A few reach this age with 50 years of service behind them. These veterans are regarded the royal family among carriers.

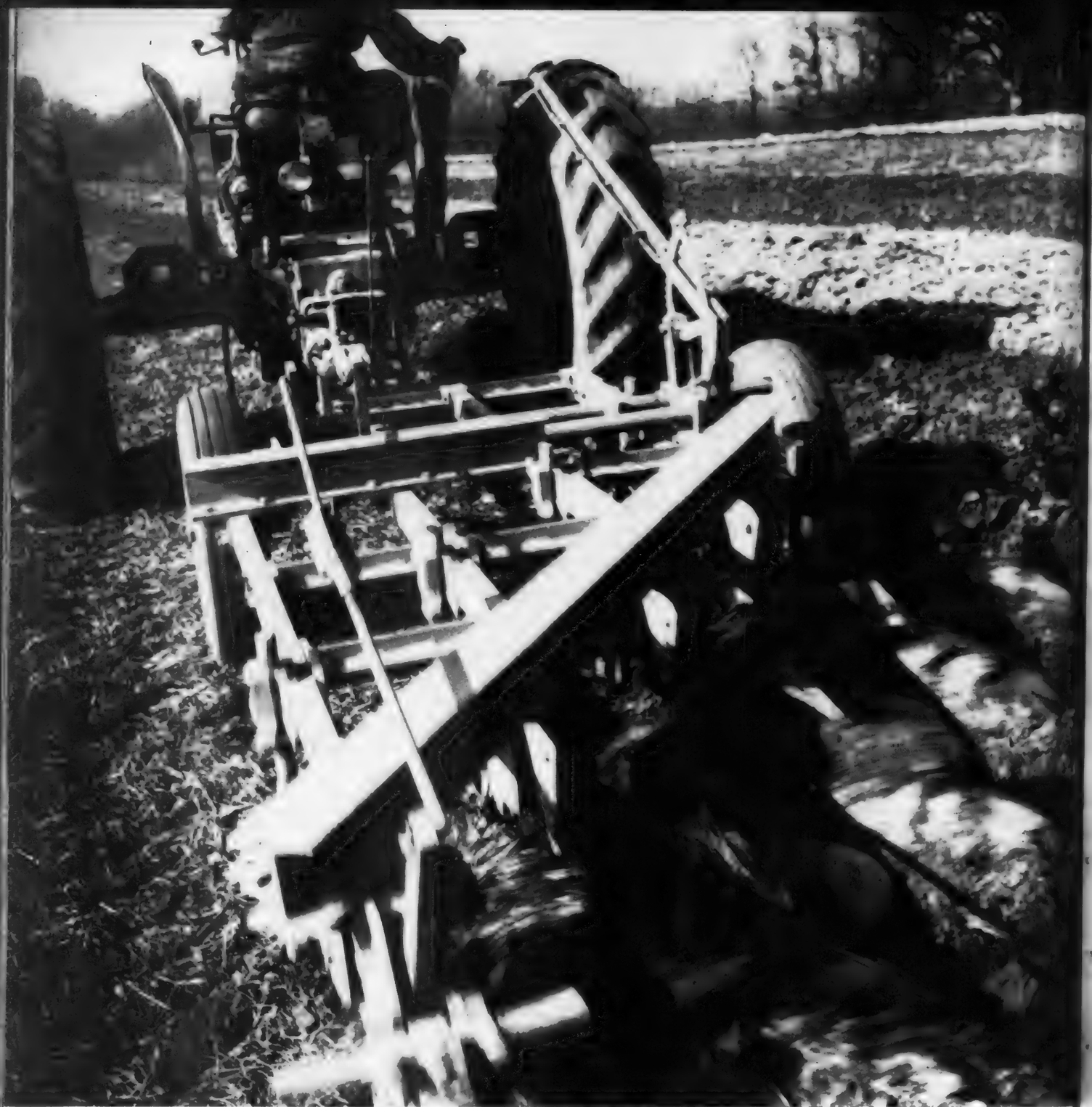
A carrier is chosen from the area he will serve. When a vacancy occurs, a Civil Service examination is held and the highest man, usually, gets the appointment. The qualifications are simple—a citizen, must know postal rates and regulations, be able to read No. 4 print at 14 inches, be sound of wind and limb. Both sexes are eligible, but the calling has scant appeal for women. Out of the 32,000-odd carriers, only 348 are women.

"Miss Lutie" Mayfield, Morely, Missouri, retired last year on her annuity at the age of 70, one of the few women carriers to achieve that distinction. She became a carrier after the death in France of her husband in the First World War. She had previously been a school teacher.

Rural mail has been delivered from about every sort of contrivance that moves —buggy, motorcycle, sled, sleigh, wagon, bicycle, automobile, by foot, and from the back of a mule. About the turn of the century the Postoffice Department authorized a standard delivery wagon, a boxlike affair, painted white, with the inscription, U. S. MAIL, and the route number.

(*Continued on page* 80)

AS ROADS improved, carriers gave up the horse and took up with the new automobile. Here is one, vintage of 1906, with a mail rack in the dashboard, rear drive, one-lung engine, and clincher tires.



WITH husky Diesel power many farmers have doubled the number of acres they plow in a day.

Diesel Power

The Diesel engine, now available in a farm size unit, brings rugged economy and an untiring back to speed up all kinds of farm work

By Fred Knoop

As the morning sun poked through the oilcans and worn plowshares in the tractor shed, Jesse Turner swung up into the seat and gave the starter a push. It was a cold, early-spring morning, and, after a few tentative turns, the engine caught and the tractor barked its way out of the shed and up to the fuel tank. There he let it help itself from the overhead tank. "That," said Jesse to himself, "should keep me plowing till sundown."

Jesse's talking to himself wasn't as unusual as his expectations—that is, when you looked at the three husky 14-inch plows he was dragging back of the tractor. If you ask Jesse how he plows ten hours on a 20-gallon tank of fuel, he'll answer: "There's no secret about this kind of fuel stretching. It's a Diesel and it will burn the same oil I use in my furnace. Or I can use regular Diesel fuel in it. It took a long time for Diesel engines to get into row-crop tractors, but I couldn't do without one now."

Jesse is one of the increasing number of farmers who have put a compact Diesel engine to work on their farms. His row-crop tractor is just about the size of the ordinary 3-bottom plow tractor, but it has the fuel economy that goes with Diesel operation and it has the extra lugging power that comes from the way that a Diesel uses fuel to generate power.

And just what is the difference between a gasoline and a Diesel engine? Many a farmer has seen mail-order schools advertise, "We can make you a Diesel operator in 52 easy lessons," and has decided this complicated contraption is not for him.

The Dark, Mysterious Interior

The inside of a Diesel is actually simpler than a gasoline engine.

It has pistons, valves, and crankshaft. The castings are, or should be, heavier than those that form the block and outer shell of the conventional gas engine. A heavy-duty Diesel engine may have crankshaft bearings between every cylinder. The reason for all this heavyweight construction is that a Diesel operates at higher compression than any other type of engine. Higher compression helps develop more power to plow with, and also more power to hold in control. A Diesel is a more simple construction in that it has no carburetor, distributor, cables, or spark plugs. It is actually a "heat engine."

Dr. Rudolph Diesel, who invented the crude ancestor of the present-day engine in 1893, was a German refrigeration engineer who became so interested in the properties of heat that he was convinced that an engine built around his idea would get the most power out of the cheapest fuels. He first proposed to use coal dust as fuel. Later, he turned to fuel oil, which is now universally used. The "idea" around which a Diesel engine whirls is that when air is compressed, its temperature rises tremendously. If you put your hand on a bicycle pump after working on a leaky tire, you can appreciate how much heat is generated by compressing air. When air is compressed to 575 pounds per square inch in a cylinder—which it is in a Diesel engine of 15 to 1 compression ratio—the temperature rises to 1000 degrees Fahrenheit. If you spray fuel into this hot air, it ignites easily. As the piston is pushed down, you get continuing igniting, burning, and expansion of the fuel, over a long period of time as compared to the instantaneous explosion and short-timing of the sparked explosion of a gasoline engine. This, in a nutshell, is how the Diesel gets its sustained lugging power.

IT WAS a short spring for Les Gunning of Lansford, North Dakota, with 30 more days of winter than usual. To make up for lost time he hitched up a cultipacker and a drill back of the four-bottom plow and with one operation turned a wheat stubble into a planted field. The John Deere "R" pulled the train in the 4th gear at about 5 m.p.h.

So, to make a Diesel work you must have a fuel pump that will push an accurate, measured amount of oil into each cylinder, and to put the oil into this high-pressure air in the cylinder, you need some kind of a high-pressure valve. This valve is called the injector and it serves also to turn the fuel into a mist, or as the engineer would say, "atomize" it.

A Diesel engine is "timed" by the period of fuel injection rather than the moment of sparking as in a gas engine. Most Diesels used for farm work are 4-cycle engines. When the piston goes down in the first stroke, air passes through the air cleaner and is pulled directly into the cylinder. There is no carburetor, for the Diesel needs no carburetor. The engine gulps in a tremendous helping of air; it uses a much greater proportion of air to fuel than a gasoline engine, part of the secret of its fuel economy.

Incidentally, the fact that a Diesel runs "wide open" on its air intake all the time is responsible for its greater efficiency and economy over gasoline engines. For a gasoline engine must act as vacuum pump most of the time, wasting part of its power in maintaining this vacuum. Only at wide-open throttle is it free of this braking effect.

In the second stroke the direction of the piston is reversed and it starts back up the cylinder, compressing the air as it goes and generating the heat needed to keep itself going.

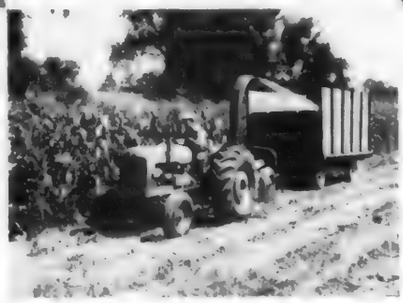
As the piston reaches the top of the stroke, the third cycle starts as the fuel pump forces an accurately measured amount of oil through the injector, turning it into a fine spray. As this enters the top of the cylinder, it meets the hot compressed air. The oil ignites, burns, and expands, forcing the cylinder downward.

The fourth stroke occurs as the piston travels back up in the cylinder, pushing out the exhaust gases.

THESE ARE the simple, easy-to-get-to fuel pumps and governor of the Sheppard SD-3 tractor. When the engine is under heavy load the governor causes the pump plungers to make longer strokes, putting more fuel into the cylinders. With a light load they make shorter strokes.

ROTARY TILLAGE requires sustained, heavy-duty power on the tiller unit, for which the Diesel fills the bill.

OLIVER'S 88 in an optional Diesel model is completely surrounded with a two-row corn picker.



FORD MOTORS new entry in the Diesel field is the "Fordson Major," which is imported from England.

GENERAL MOTORS 2-cycle Diesel makes a husky power supply for pumping irrigation water at a low cost per hour.

There are two-cycle Diesel engines and one of the best-known is made by General Motors. In a two-cycle engine every downstroke is power and exhaust combined, and the upstroke is intake and compression. They work well under heavy loads and can develop over 1½ times the horsepower of an equal-sized 4-cycle engine.

The economy of the Diesel engine comes from these special characteristics: (1) Diesel fuel contains more heat units than gasoline, between 12,000 and 21,000 more BTU's per gallon, which is the same as saying it has that much more power per gallon; (2) a Diesel engine will usually use 50 per cent less fuel to develop the same power as a comparative-sized spark-ignition gasoline engine; (3) Diesel fuel will usually cost much less than gasoline.

Here's how you can figure *fuel savings* with a Diesel engine. Just substitute your own gasoline, tax, and Diesel fuel costs and you'll come out with the saving you can expect to make:

If the cost of gasoline is	17c per gallon
and the state tax is	5c
the cost would be	22c per gallon

If Diesel fuel oil costs	11c per gallon
with no tax	
the cost of Diesel oil is	11c per gallon

The ratio of cost is $\frac{11}{22}$ or .5

Now you want to find the *fuel use* ratio and since a Diesel uses only 50 per cent as much fuel as a gasoline tractor, we have a fuel use ratio of ½ or .5.

So your operating cost will be the *fuel cost* times the *fuel use* ratio or:

.5 × .5 = .25, or an operating cost of just about 25% as much as a gasoline tractor.

If a farmer operates his gasoline tractor for 700 hours a year, his cost for fuel might be:

700 × 2 gals. gasoline per hour = 1400 gallons

1400 gallons × 22c = $308

His Diesel operating expense would be 25% as much as with a gasoline tractor, or:

25% of $308 = $77 worth of Diesel fuel

The fuel saving would be $308 minus $77 or $231.

Who Should Use Diesels

The figures given above for figuring fuel savings are a good guide for determining who should drive a Diesel and who should stay behind a gasoline engine. With the announcement this spring of Diesel power as optional (at extra cost) on many of the regular lines of tractors, the farmer has a chance to decide whether he wants to use a Diesel, gasoline, distillate or L. P. gas tractor. The extra cost of Diesel power will amount to $500 or $1,000. If a tractor is kept rolling most of the daylight hours it will get 700 hours use and the fuel savings in using a Diesel tractor might well pay for the extra cost by the end of the second year.

In addition to fuel economy, there is a safety advantage in the use of Diesel fuel over gasoline or bottle gas, for it does not ignite easily from flames or sparks. Nor does Diesel fuel evaporate in hot weather or leak out silently as gas can do.

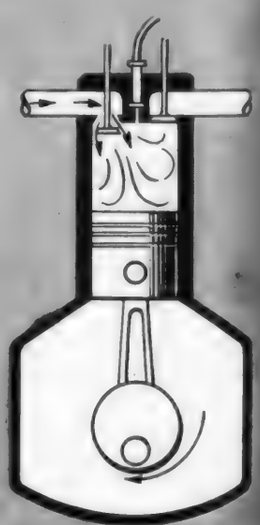
Diesel fuel isn't "borrowed" for use in cars, either, and, as one Iowa farmer says, "When we had a gasoline tank my brother would fill up every time he came out on Sunday to visit us. Diesel fuel has eliminated that sort of thing; quite a saving in itself."

Repair bills on Diesel tractor engines should be less than on other types, for the engines are heavier and the power is developed with a smoother piston stroke. But repairs can vary with the work being done and the care the operator gives his engine.

As for long service life, nothing in

WHAT MAKES A DIESEL ENGINE RUN ?

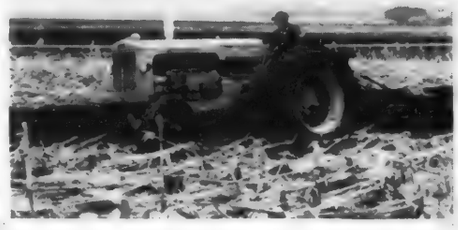
A Diesel engine has no spark-plugs, magneto or carburetor. In place of a hot spark it uses the heat that is created when a piston pushes up and compresses the air in the cylinder. Fuel oil is sprayed into this hot air; it ignites and drives the piston down. The diagrams show the different stages in the operation of a 4-cycle Diesel engine.



Clean air is pulled directly from the filter through the open valve into the cylinder on the down stroke.

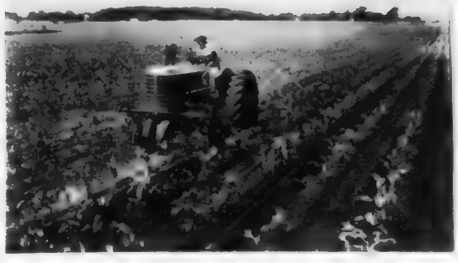
A CATERPILLAR D6 with a dozer blade makes good use of its weight building a 6000 ton stack silo in Idaho.

A CASE 500 pulling an 18 foot one way disk plow in wheat stubble. Power steering makes the operation easy even in soft ground.



A MINNEAPOLIS-MOLINE G puts a 4-bottom plow to work early in the spring; its power is a match for the sticky gumbo.

INTERNATIONAL'S Super WD-9 has deep-tilled up to 55 acres a day with this 13 foot stubble mulch tiller, on less than $5.00 fuel.



MASSEY-HARRIS 44 Special is as easy to handle for row-crop cultivating as any gas model. The engine works well on light load conditions.

the power line can touch a Diesel which has been cared for. Caterpillar, which has had longer experience in the Diesel field than any other firm, points out that the first Diesel crawlers they made in 1931 are still hard at work with the original engines—one in Hawaii, and one in the logging area of California, with time records approaching 100,000 hours.

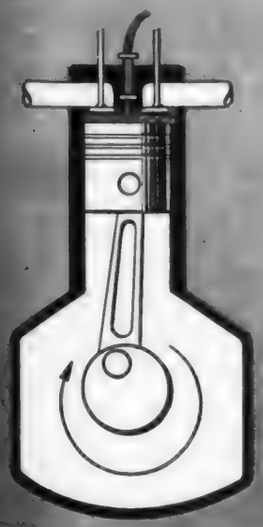
Now, with the demand for Diesel power having been created by crawlers, which are being used for big-time farming all over the West, it is natural that farmers will want Diesel engines in their wheel tractors. And, without much fanfare, Diesel power is being offered as an "optional" at an extra cost on many lines of wheel tractors. One manufacturer has found the demand was there all right—all he needed was to offer the Diesel engine in his various models—and last year 50 per cent of his sales were Diesels.

One of the wheel-type Diesel tractors on the market today started from another kind of thinking. The Sheppard Company of Hanover, Pa., has been making Diesel engines for all kinds of power units since 1936. They felt that Diesel was the only kind of power that was needed in tractors, and they have built 2-plow, 3-plow, and 4-plow tractors around three different sizes of engines, matching the tractor strength and weight to the heavy-duty engines.

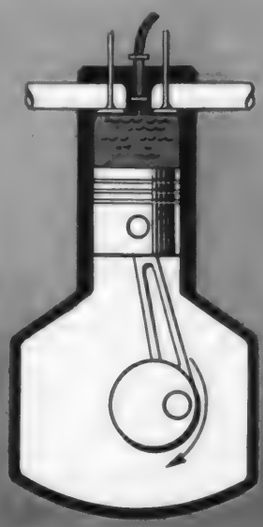
In the West, as well as plowing the big acreage, Diesel power has long been the means of pumping irrigation water and often supplies electric power for lights and other service. These are special uses that a Diesel can offer where long periods of steady operation are just what a Diesel engine likes. Chicken farms and hatcheries often depend on standby power plants operated with Diesels.

There are a number of companies making Diesel engines which are suitable for farm use as pump engines, standby power generators, etc. The right one to use will depend on horsepower available, weight, and mounting suitability. Among the

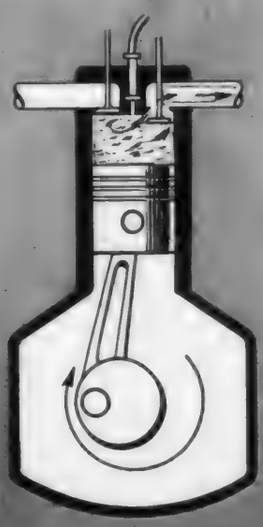
(*Continued on page* 110)



As the piston is pushed up the air is compressed into a small space, generating heat of over 1000 degrees. Fuel oil is now injected.



The power stroke starts as the fuel ingnites, burns and expands. Fuel oil is injected during the stroke.



The exhaust stroke clears the burned-out gases from the engine cylinder through the open exhaust valve.

The Reluctant Goose

The French stuff a goose to the ears with feed; from his oversized, fat liver they make pate de foie gras

By R. J. McGinnis

IF THE CHEFS of the world ever adopt a coat of arms the shield will no doubt bear a Strasbourg goose rampant on a field of truffles. From the so-called Strasbourg goose come the oversize livers so esteemed by gourmets the world over. From them also is made pate de foie gras, a paste or spread of liver, with truffles and seasoning.

A Strasbourg goose is a goose of any breed fed by force and penned in a tight place so that he can't walk off his fat. The cells of his overloaded liver break down, and he becomes a sick goose. Just at the right time he is butchered and his liver, fat, and carcass are sold to people who like fine delicate foods. They in turn get the gout, which is only poetic justice.

A goose, left to himself, will consume an unbelievable amount of feed and water in a day. If he is caught, held down, and feed forced into him, the amount goes up. There is no brake on his digestive system, which goes on working twenty-four hours a day, piling up fat. As greater and greater demands are made, his whole digestive system from gullet to liver, enlarges.

Force feeding a goose is not as simple as filling him up to his ears with grain. There's an art to it, an art which requires an expert knowledge of the goose's possibilities and limitations. The goose stuffer must develop a callous indifference for the discomfort of his victim. The S.P.C.A. would certainly not allow goose stuffing in this country. There have been no complaints that we know of, for few Americans know how to stuff a goose.

How to Stuff a Goose

By trial and error (when you make a mistake you have a dead goose on your hands) people in parts of France and Germany learned the art of force-feeding geese from the Romans. The routine is not difficult to learn.

First you catch the goose, using the proper caution. A goose can break the

skin with his sharp-edged beak, and he can give you a nasty whack with the bony edge of his wing. The most acceptable method of restraining him is to kneel down over him, bringing the legs together to confine his wings. Then he is grasped under the beak and head, which is drawn up to a vertical position. With one hand the beak is held open and with the other feed is forced into his gullet. It's just as simple as that, but there's a catch.

The goose, when his crop is empty, obliges by swallowing the feed, but as soon as he feels he has had enough, he rebels. Feed piles up in his gullet and must be forced into his crop by a gentle downward stroking. Here is where you can get into trouble, for should a grain fall into his windpipe he is a gone goose. If he doesn't choke to death, he never does well and is abandoned as a candidate for pate de foie gras. There are some who say they have the skill to extract a grain from the windpipe, but this skill is rare.

The actual stuffing lasts about three weeks, but is preceded by a week of training during which the bird is fed an ever-increasing ration each day. Then he gets the works. He is now in the hands of the stuffer and the immutable laws of physiology.

The aim is to achieve that delicate balance of feeding which will cause the liver cells to break down, but not lose their function entirely. Should this happen fatty tissues will develop in the liver and it will shrink when cooked. Too much feed, or careless feeding, will often suffocate the goose. The best stuffers feed three times a day.

Although you can stuff a goose with any kind of grain at hand, corn is preferred. There are two schools of thought on corn, one holding that yellow corn produces the best flavored liver; the other maintains with equal vehemence that white corn is the only proper grain for stuffing. Both agree that the corn must be of the preceding harvest. It is either soaked overnight, or barely cooked in boiling water. The goose is given plenty of water, all he wants. Alkaline water is thought to improve the flavor of the liver.

The actual task of stuffing is tedious and slow. The victim is always reluctant, and will clamp down on a finger when he gets half a chance. Various ingenious contrivances have been invented to expedite stuffing. One of the best is a funnel equipped with an auger turned by a handle. The spout of the funnel is shoved down the gullet past the windpipe and the corn is augered into the crop. A refinement of this device is operated by a foot pedal or an electric motor, leaving both hands free to manipulate the goose. These gadgets are made by inventive blacksmiths; they are not on the market.

From 25 to 30 pounds of corn are necessary to obtain a pound of liver, depending on the aptitude of the goose, the quality of the grain, and the skill of the stuffer. The weight of the liver varies from one to three and a half pounds. Livers weighing in the neighborhood of a pound and a half are the most sought after because of ease of handling and sale. As a rule, the heavier the liver, the lower its quality. A good liver is pink and plump.

Choice cooked goose livers are selling, on the Continent, for $4.50 per pound—common grades for as low as $3.25 per pound. The very select livers of superior quality are cooked and canned and find a ready market around the mink coat circuit in America. The price here doubles and triples. Damaged livers and odds and ends are mixed with truffles, butter, herbs, spices and other exotic seasonings and sold in cans as pate de foie gras. The truffles preferably must come from Perigord. Every American butcher shop has a pale imitation of pate de foie gras, the so-called chicken liver sausage.

The residue of the goose after the liver is taken out is sold for roasting or baking. It is sometimes cut up, cooked, and packed in cans in its own grease or pork lard. It's good, too, tender and full-flavored, but fattening.

Although there is a steady, if exclusive, foreign market for French goose liver, the production is seasonable. The livers arrive on the market from the beginning of December to the end of January, and local consumption is heaviest around Christmas and New Year.

The practice of stuffing geese probably originated around Strasbourg, France, and neighboring parts of Germany. German emigrants took the art to Hungary hundreds of years ago and in time Strasbourg became only a processing center, depending on imported Hungarian livers for its industry. Since the Hungarians are setting up processing plants of their own, the French industry has withered, although the French, who zealously guard their secret recipes, are said to make the best pate.

By far more geese are now stuffed in south-west France, in the regions of Landes, the Pyrenees, and in the province of Gers. There are scattered localities in southern Germany, Holland, Belgium, and Britanny where an occasional goose is stuffed.

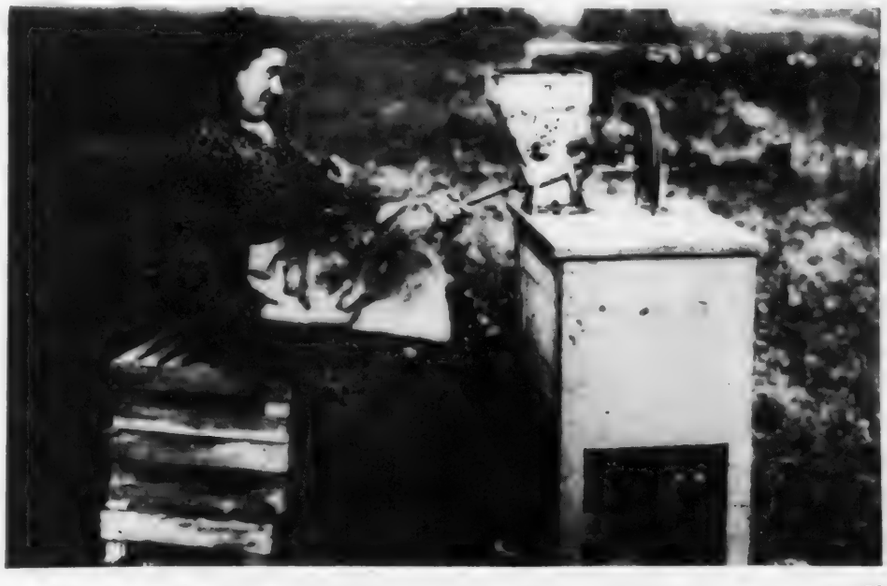
Goose Stuffer, U.S.A.

While there may be laws against goose stuffing in America, there are none against a stuffer entering the country. Mrs. Margaret Bushbacher came to America in 1903 from Hungary. One of her ancestors, two hundred years ago, emigrated from Germany and took with him the art of force feeding geese. Mrs. Bushbacher learned it from her mother. Once she was in America she toned down the traditional method of force feeding. She penned her geese in a dark, close, "goose stable" and fed them all they would eat. On rare occasions she would force feed one of her more upstanding birds.

She fed them a month or six weeks and sold both livers and the goose grease. Ten years ago, before arthritis caught up with her, she was getting $3.00 for 3-pound livers and $2.00 to $3.00 for the fat from one goose.

Mrs. Bushbacher added an item of interest to the lore of goose stuffing. "Sometimes a goose throws up the corn after he is fed," she said. "We always tied a corn husk around his neck for a few minutes." She doesn't think force feeding a goose is cruel and unusual treatment. "In Hungary they used to nail their feet to the botton of the barrel," she said. "That *is* cruel, and my mother never allowed us to do that."

THE FRENCH HOUSEWIFE usually has charge of the goose stuffing department. On the opposite page she augers corn into the goose's crop. Below, she works a stuffing machine with her foot. It's easier for her, but it's just as hard on the goose.



Bluegrass

Some farmers call it a weed; but to many a livestock raiser it is still the king of grasses

By Robert S. Koch

IT'S BECOME a fad, in recent years, to damn bluegrass as a "weed," and a good many words have been written on how to get rid of it. But bluegrass has been with us a long time, and it's been the old standby on American farms. I reasoned it must have some good points, and I resented its being called a weed. That didn't speak well for our farming, for our farm is covered with bluegrass.

I decided to find out the truth about bluegrass. We're farming about a thousand acres of good land down here in central Kentucky and a good deal better than half of it is in grass. If bluegrass is a weed, or even if it's just a mediocre grass outclassed by a number of substitutes, I wanted to know about it. What I have to say here is the result of several seasons of observation and research.

To start with, it's Kentucky bluegrass about which we're talking—*Poa pratensis,* as the botanists call it—a plant that is found throughout all of North America and Europe. It covers possibly as many as 100 million acres in the United States. Like most of us, it originated in Europe, though somehow or other it seems to have arrived in Kentucky long before the coming of Daniel Boone and his crowd. It is the plant that most people in the humid northern part of North America have in mind when they speak of grass.

Our livestock setup is beef cattle and sheep. We graze a lot of steers and keep a flock of 200 to 250 ewes for spring lamb production. There is nothing that could take the place of bluegrass in this program. It's perfect for the cattle and the ewes. For putting fat on lambs, though, I'm going to have to admit that it just won't do the job. That calls for legumes.

We've had wonderful success with bluegrass, too, as a conservation tool. That thick, dense sod it forms with a great mass of roots in the upper few inches of soil can't be beat when it comes to holding the top soil on a steep piece of ground or for healing over a ditch or gulley and protecting the ground against the pounding of the rain.

Come Down and See Us

If you were able to come down here and visit with us a while I'd show you just what I mean. I'd take you over across Comb's Ferry Road there and show you a field we sowed to bluegrass in the spring of 1950. There are 30 acres in it and last winter, after one of the most severe droughts we've had for a long while, along with the rest of our bluegrass pastures, it had a stand of grass anybody would have been proud of. This particular piece had been in corn for two years. In the fall of '49 we sowed it to a cover crop of rye. Then in February of '50 we broadcast both ways with a mixture of 14 pounds of bluegrass per acre, 6 pounds of red clover and 2 pounds of Ladino. That is, we took half the mixture and broadcast it north to south and then broadcast the other half east to west. We used no lime or fertilizer as we figured there were plenty of residues from the treatments given the corn. The corn had been put in both years with 500 pounds of 4-10-10 and side dressed with 100 pounds of ammonium nitrate.

That summer we combined the rye and we grazed the field lightly with sheep that fall.

The next year, '51, was a dry one. We got just one cutting of hay; put it up in a rick right on the field and built a fence around it. Then we grazed cattle on the field from late summer through the fall. There's a tobacco barn up on the hill on the south side of this field. During the winter we ran 100 ewes to this barn and let them have access to the field and rick. The 30 acres were eaten off close by the time the winter was over. Naturally, those ewes got some grain, too. That's the only way to prevent serious loss from pregnancy disease.

That spring, the spring of '52, we gave the grass a shot of 50 pounds of ammonium nitrate per acre early in March, the idea being not only to increase the stand of forage, but to get a good yield of bluegrass seed. In May we sprayed with DDT to get the bluegrass bugs and on the second of June stripped 25 bushels of rough seed to the acre. I'll tell you more about these seed yields later. But believe me, that's good.

Later that summer we mowed with our sickle-bar set high to top the weeds and in late fall turned in 50 steers to run to the barn on the hill. The steers cleaned up what was left of the rick and were taken out the first of March, 1953.

Last year we repeated the nitrogen treatment, sprayed with a half pound per acre of 2,4-D to get some weeds that had put in an appearance, and substituted aldrin for DDT on the recommendation of the Experiment Station to get the bugs. We got another excellent yield of seed; again mowed high; then ran 84 head of cattle on this and an adjoining field of 170 acres all through the late summer, fall and winter of a year it forgot to rain. To supplement the grazing the cattle were given something less than 10 pounds per head per day of grass hay in January and February—hay which had been cut from another field after the seed was stripped. This field will stay in grass for at least two more years.

Management Problems

That's the way we handle our bluegrass pastures. Sometimes we'll sow bluegrass with clover and the following year we'll get a wonderful clover hay crop. It will look like the bluegrass didn't catch at all. The next year, though, the bluegrass will be there in force. That points up two of the problems in management of bluegrass pastures. The grass is slow to get established, then once it starts to roll it has a tendency to crowd out the clover. And you should have clover in the field. The clover supplies the nitrogen needed by the grass to make a more nutritious forage. The half pound per acre of 2,4-D we used last year did not injure a good stand of clover.

Wild white clover, or Dutch clover, has always been considered a first rate companion for bluegrass, but of late years we've found it hard to keep it in the stand. Lespedeza makes an excellent teammate for the grass. It's at its best right at the time the grass goes into its midsummer period of dormancy. Birdsfoot trefoil is another legume that is currently being touted as a natural with bluegrass. It is longlived and aggressive once it gets started and can hold its own against crowding.

Grass and Cattle

We are mighty high on bluegrass pastures for cattle. Stock will eat bluegrass any time they can get their tongues around it. It doesn't get coarse with maturity and you can let it grow up in the fall for winter grazing. The old timers down in this section knew this and parlayed it into family fortunes by raising "export" cattle on grass and just a little corn for shipment to England and continental Europe.

I have compared notes on this point with Dr. W. P. Garrigus, head of the Animal Husbandry Department over at our Experiment Station. This is the way he sees it:

"In speaking of the usefulness of any

(*Continued on page* 123)

A "BLUEGRASS YARD" where stripped seed is cured and sacked before cleaning. In early spring (opposite) there is no pasture like a bluegrass-clover combination.

THIS IS J. J. Lawson and one of the gallon milk jugs that has become his trademark. He says: "If the price of milk is reasonable, families will keep a gallon in the icebox and the children will have all they want and need."

JUG MILK

ANYONE with a family knows children have a bottomless pit when it comes to drinking milk. It costs money to try and fill that pit.

At the same time anyone who reads the papers or listens to the radio or watches TV is aware that the nation is faced with a huge milk surplus. Parity has been reduced, some dairy farmers have taken a beating and officialdom tears its hair. Yet in most areas the surpluses continue to grow.

These two seemingly isolated points have a common meeting ground that holds the solution to our dairy surpluses according to the nutritionists . . . and that is the breakfast table. Nutrition experts say as a nation we do not drink the amount of milk we should. In the next breath they say if each person drank just one more glass of milk each day we would have a shortage instead of surplus.

The obvious question then is "why don't people, you and I, drink more milk if we like it so much?" The probable answer will bounce right back—it costs too much in the amounts we would like. Check around you and see for yourself how many people "let the children" have the milk and how many count the quarts like a child counts his piggy bank.

If the cause for inadequate consumption is price, what can be done about it? Is there a solution to this problem that will not hurt but actually help all three—the dairy farmer, the dairyman, and the consumer. Well, some dairy farmers and dairymen not only think there is a way, they know there is a way.

Simply, it is to let the consumer be his own deliveryman and pick up the milk he needs in bulk containers at a convenient local store. Milk can be sold at a much lower cost to the consumer this way, which in turn means the consumer can afford to drink more.

But before we go into this subject let's see what some dairy farmers, who sell to dairies that sell milk as milk has been sold for years, have to say about the current milk market.

Says John Hostetter of Littletown, Pennsylvania, "It cost us 40 cents a hundred when the price dropped back on the first of April. The dairymen around here

By Robert Taylor

Lower prices, surplus production and competition from substitute products are the dairy farmer's problems. Cash-and-carry sales in gallon jugs are proving to be one answer to selling more milk to the public

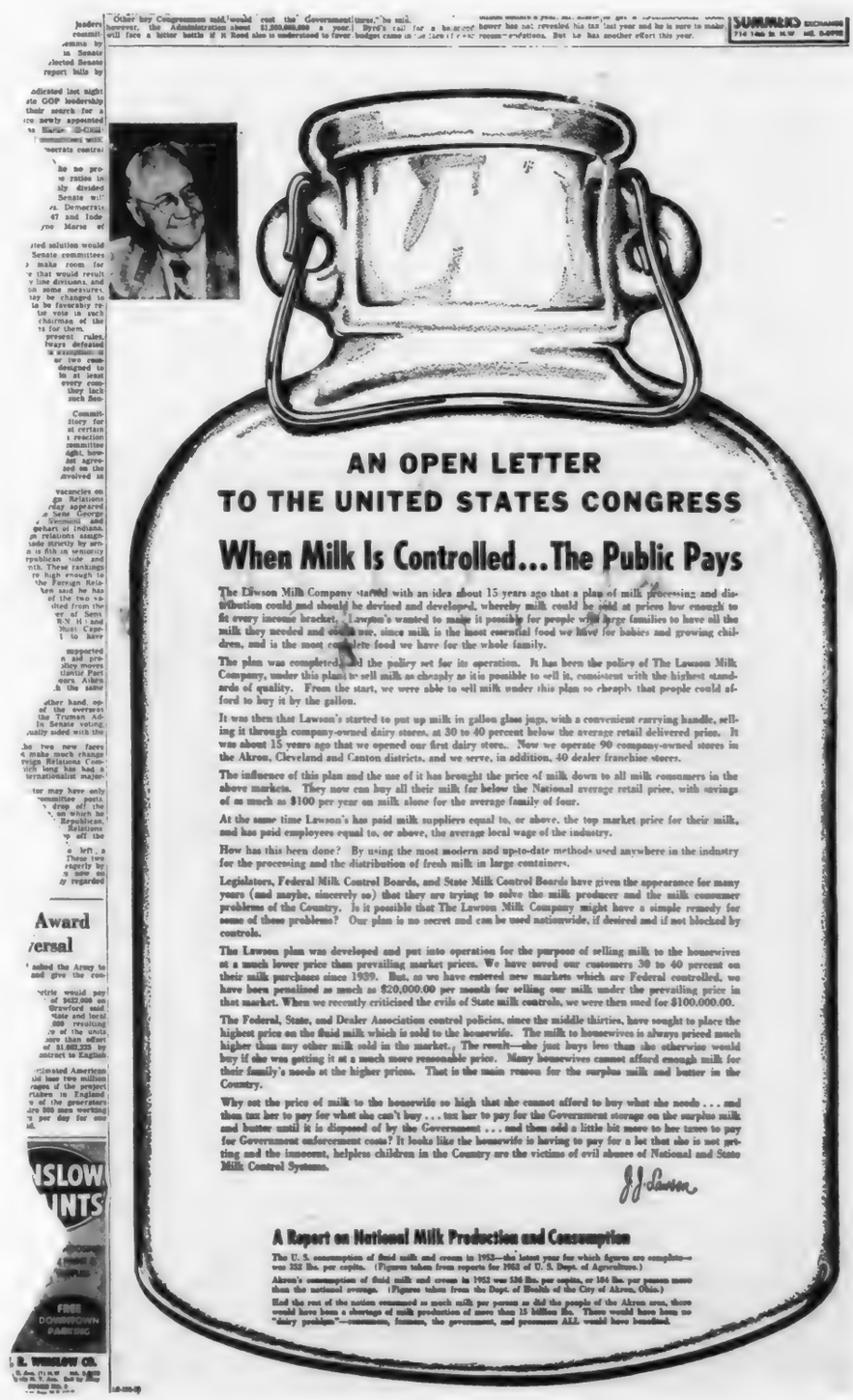
fought it for a while, but we take what we get, usually. My boy and I just get paid less for our time. I wouldn't mind it so much if the people in cities got a real price cut on their quarts of milk. That would sell more milk, and help all us farmers."

Jumping to New England, the home of high-producing herds that send their milk by big stainless steel tank trucks down to Boston and New York, we get another dairyman's thought. Says Alfred Campbell of Terry Brook Farm, Arlington, Vermont, "Nobody told us to go into the dairy business. We chose dairying because we liked it. We still do, but sometimes we feel that the cash return is hardly in proportion to the vast expenditure of muscle and brainpower and the size of our investment. Our capital investment here, in livestock, land and farm machinery, totals more than $35.000, and ours is only a moderate-sized establishment. If we choose to expand, far more labor-saving devices will have to be installed; not because we are getting tired of work, but because there are not enough hours in the day to get everything done. Farm labor is scarce, and efficient farm labor is almost impossible to find."

Continues Campbell, "There is a huge gap between the price a producer receives for his milk and the price it brings in city stores. Something has to be done about that, so the producer will receive enough profit to enable him to go on.

"Our grain bill runs to more than $3,000 a year. If we feed less grain, we get less milk. For the grain which cost me $1.70 per hundred pounds in 1932, I now pay $5.00, nearly three times as much. If I were receiving three times as much for my milk, the situation would not be so bad, but the wholesale price of milk has not risen at anything like a proportional rate.

"Other factors reduce my profit still more. We are paid on the basis of 3.7 milk, milk which contains 3.7 per cent butterfat. For every tenth of a point above that, we are paid a bonus; for every tenth of


AN OPEN LETTER
TO THE UNITED STATES CONGRESS

When Milk Is Controlled...The Public Pays

The Lawson Milk Company started with an idea about 15 years ago that a plan of milk processing and distribution could and should be devised and developed, whereby milk could be sold at prices low enough to fit every income bracket. Lawson's wanted to make it possible for people with large families to have all the milk they needed and could use, since milk is the most essential food we have for babies and growing children, and is the most complete food we have for the whole family.

The plan was completed, and the policy set for its operation. It has been the policy of The Lawson Milk Company, under this plan, to sell milk as cheaply as it is possible to sell it, consistent with the highest standards of quality. From the start, we were able to sell milk under this plan so cheaply that people could afford to buy it by the gallon.

It was then that Lawson's started to put up milk in gallon glass jugs, with a convenient carrying handle, selling it through company-owned dairy stores, at 30 to 40 percent below the average retail delivered price. It was about 15 years ago that we opened our first dairy store. Now we operate 90 company-owned stores in the Akron, Cleveland and Canton districts, and we serve, in addition, 40 dealer franchise stores.

The influence of this plan and the use of it has brought the price of milk down to all milk consumers in the above markets. They now can buy all their milk for below the National average retail price, with savings of as much as $100 per year on milk alone for the average family of four.

At the same time Lawson's has paid milk suppliers equal to, or above, the top market price for their milk, and has paid employees equal to, or above, the average local wage of the industry.

How has this been done? By using the most modern and up-to-date methods used anywhere in the industry for the processing and the distribution of fresh milk in large containers.

Legislators, Federal Milk Control Boards, and State Milk Control Boards have given the appearance for many years (and maybe, sincerely so) that they are trying to solve the milk producer and the milk consumer problems of the Country. Is it possible that The Lawson Milk Company might have a simple remedy for some of these problems? Our plan is no secret and can be used nationwide, if desired and if not blocked by controls.

The Lawson plan was developed and put into operation for the purpose of selling milk to the housewives at a much lower price than prevailing market prices. We have saved our customers 30 to 40 percent on their milk purchases since 1939. But, as we have entered new markets which are Federal controlled, we have been penalized as much as $20,000.00 per month for selling our milk under the prevailing price in that market. When we recently criticized the evils of State milk controls, we were then sued for $100.000.00.

The Federal, State, and Dealer Association control policies, since the middle thirties, have sought to place the highest price on the fluid milk which is sold to the housewife. The milk to housewives is always priced much higher than any other milk sold in the market. The result—she just buys less than she otherwise would buy if she was getting it at a much more reasonable price. Many housewives cannot afford enough milk for their family's needs at the higher prices. That is the main reason for the surplus milk and butter in the Country.

Why not the price of milk to the housewife so high that she cannot afford to buy what she needs . . . and then tax her to pay for what she can't buy . . . tax her to pay for the Government storage on the surplus milk and butter until it is disposed of by the Government . . . and then add a little bit more to her taxes to pay for Government enforcement costs? It looks like the housewife is having to pay for a lot that she is not getting and the innocent, helpless children in the Country are the victims of evil abuses of National and State Milk Control Systems.

J. J. Lawson

A Report on National Milk Production and Consumption

The U. S. consumption of fluid milk and cream in 1952—the latest year for which figures are complete—was 352 lbs. per capita. (Figures taken from reports for 1953 of U. S. Dept. of Agriculture.)

Akron's consumption of fluid milk and cream in 1953 was 536 lbs. per capita, or 184 lbs. per person more than the national average. (Figures taken from the Dept. of Health of the City of Akron, Ohio.)

Had the rest of the nation consumed as much milk per person as did the people of the Akron area, there would have been a shortage of milk production of more than 15 billion lbs. There would have been no "dairy problem"—consumers, farmers, the government, and processors ALL would have benefited.

LAWSON takes his thinking on milk marketing to the public . . . and Congress. This advertisement ran in the Washington *Post*.

a point below, we are docked. Our herd of Jerseys has records of 5 per cent to 5.7 per cent b.f., depending on season and other conditions. But we are at the mercy of the dairy which buys our milk. They take a daily sample and test it for butterfat at the end of every two-week period. By law they are allowed an error of two-tenths of a point, and it is seldom that that error is not present. Sometimes the error is far greater, but in order to do anything about it I have to have separate laboratory tests made at my own expense, and then make an issue of the thing. If the dairy refuses to make an adjustment I can call in a state inspector and tester, but even they cannot force the dairy to reimburse me. Lately I have joined a small protective association which takes care of these details for me, but when they obtain an adjustment it is only after spending considerable money and time.

"There was a time when the dairy paid a bonus for milk low in bacteria, but in our area they have discontinued the practice. I am still as conscientious as ever about barn and milkhouse sanitation, and spend as much on disinfectants, whitewash, and paint, but many of my fellow dairy farmers clean up only when the annual inspection is due.

"We are paid for our milk on two levels; one for the Class I milk, sold in bottles for drinking purposes; and the Class II milk, sold as powdered milk, and for cheese and other dairy products. Class II milk brings a far lower price. I have to take the word of the dairy, and of the federally-appointed Milk Market Administrator, that the figures they present on the proportion of my milk used in each class are correct.

"The dairy tells me that they are trying to stimulate further sales of Class I milk. They have asked me to contribute monthly a proportion of my milk check, to be used in their advertising campaigns. I feel that a million-dollar corporation should be able to pay for their own advertising, so, although I have been high-pressured, and told I would get into trouble if I didn't, I still don't contribute towards that fund. I am one of the very few producers who have refused to do so, as the dairy's representative constantly reminds me. Neither have I joined a regional protective association to which all my neighbors belong, because I have noticed that they failed to do anything for their members except make a few gestures towards adjusting mistakes.

"It is about time the public, the ultimate consumers of our product, does a little thinking about the situation."

Who Gets the Break?

Pretty discouraging picture, isn't it? But suppose the producer could sell directly to the housewife when she is shopping, or the workman on the way home from his job. Let's see how that would figure out. The farmer who gets $5.50 for his 3.7 per cent butterfat milk also pays to have it hauled to town, as much as 50 cents for the 100 pounds. So he ends up with, roughly, 10 cents a quart for his milk. Or does he? The catch is that there is more milk than the housewives can buy, or afford to buy. Milk sold directly to consumers as fluid milk is known as Class I milk. So the milk may go into Class II and Class III milk, which is made into cheese and other milk products. On this milk the farmer is paid less. Actually, our dairy farmer is lucky to come out with 8 cents a quart. Could this same farmer afford to put the milk into bottles and sell the same milk at 15 cents a quart? Just ask him!

If this farmer happens to be in an area that has a Grade A ordnance, he has only to meet the specification of his local board of health on bottling equipment and sanitation. If he is on a highway which has heavy traffic, he is in a good spot for selling his own milk retail.

The tougher problem to solve is the one faced by the dairyman located in an area where pasteurization is required. Before a dairyman can sell milk in this locality he will have to lay out an investment in a dairy plant that runs from three to five thousand dollars more. This will be in addition to his milk house. But the modern batch pasteurizer can be bought for $1200 in electric heating models. A holding tank, aerator cooler, the thermometers, sanitary milk piping, and other items will run the cost up to $5000, if new equipment is bought. Of course, he may already have a holding tank as part of his milk house equipment. Used equipment can be picked up from dairy supply houses in larger cities at 25 to 50 per cent of the original cost. Since most dairy equipment is made from stainless steel there is little wear-out to it. It is usually outgrown and traded in for larger sizes, and often real bargains can be picked up.

Dave Hahn, an Indiana farmer, set up his own small pasteurizing plant two years ago. He is located just a mile outside of town on a busy highway. He says, "We get 70 cents a gallon for our milk in gallon jugs. We figure that gives us a clear 20 cents, which is a little under 30 per cent profit after taking care of our herd, milk production cost, the amortization of our dairy building equipment, and all labor costs. In a milk market that gets 23 cents a quart from the housewife, this

TIME WAS, when the farmer could enjoy looking at the fine cows in his herd, secure in the knowledge that what they produced could be sold at a good profit. Today, the dairyman on the main highways may be thinking of ways to sell the milk in bulk at the farm. The electric batch pasteurizer, left, holds fifty gallons, is made by Vulcan Hart, Louisville. The six-foot aerator-cooler above it drops the temperature before bottling. The cooler was made by Cherry Burrell, Chicago.

price is attractive enough to bring plenty of people to our roadside dairy. And it's all cash-and-carry business."

There is still another answer to the milk problem, that is for a dairy to sell milk in bulk quantities for the benefit of farmer, dairy plant and consumer alike. This idea originated in Akron, Ohio. Known as the Lawson Plan by its originator, soft-spoken Jim Lawson, and called an assortment of unprintable names by his competition, the idea has pyramided from a small batch pasteurizer load, 54 gallons in 1938, to a peak of 37,000 gallons a day in the summer months of 1953.

Jim Lawson, now 65, recalls that he first came North, a Winston-Salem farm boy from a family of nine, to earn money to go to college in Tennessee. "I was working in a Battle Creek, Michigan, hotel, feeding people," he says, "when I met a minister who persuaded me to go to Hiram College in Ohio and save the cost of the long trip back to Tennessee. I'm still feeding people the basic necessities of life, milk and bread, and doing it a little cheaper than anyone else."

Lawson had been in the milk business several times from 1926 to 1937 with fair-to-middling success. But it was in 1938 that he hit the idea that has captured over half of the fluid milk market in the Akron area, some 500,000 people. He says, "It was when we started selling milk in gallon jugs on December 15, 1938, from our own store that I found out that people would drink more milk if they could buy it at a reasonable price. We could save quite a bit by selling them milk in gallon jugs at our store, instead of delivering it to their homes in quart bottles. It was cash-and-carry business, with no bad accounts and we would eliminate the tremendous cost of lost and broken bottles by asking the customer to buy his own jug from us, at our cost—22 cents.

"Today we are selling pasteurized Grade A milk for 52 cents a gallon, which is saving the consumer 28 cents to 40 cents a gallon over quart prices. We think we've succeeded pretty well in putting milk across here. Through our 92 retail stores we have built up the use of milk in Akron to 184 pounds more per person than the national average, which is 352 pounds. Or you can say the average person in Akron uses approximately 50 per cent more milk and cream than people do in the rest of the country.

"We haven't had to take these low prices out of the farmer's milk check, either," continued Lawson. "Our producers are getting more money—10 to 13 cents a hundred—from us than the going price in the area. We consistently pay the highest blend price—whether it be Akron or Cleveland. We keep tabs on this throughout the year and give the farmer a check for the difference once a year. Currently more than 720 dairy farmers send their

(*Continued on page* 113)

Sauerkraut

Sauerkraut got its name from the Germans, but the Tartars brought it from Asia. It's plain pickled cabbage

By Eleanor Cullen

ABOUT the time the corn is ready for the silo and you can look up from your garden and see the hills shimmy in the hot, liquid air of late August, the solid heads of cabbage are ready to be cut from their roots and carried to the house for sauerkraut. Like the chopped corn in the silo, sauerkraut is the product of fermentation. Making sauerkraut is about the simplest possible way to preserve cabbage next to laying the heads in a bed of straw head down, stem up, and mounding them over with more straw and earth. But like many of the simple things of life, art creeps into the process so that the results run from a mess of spoiled cabbage to delicious, crisp, tart kraut that borders on the elegant.

A woman who definitely has the gift when it comes to sauerkraut and one whose reputation has spread over Mason County, Kentucky, where she lives, is Mrs. Charles Harrison, whose dark hair and unlined, pleasant face seem to belie the sixty-odd seasons of kraut making she has lived through. With such experience, even so modest a woman as Mrs. Harrison will say, "I don't want to seem to be bragging on my sauerkraut, but we've had lots of visitors and a host of hired hands here on the farm and they would often say that I made the best kraut they ever tasted."

Mrs. Harrison follows the old-fashioned method of making kraut; her know-how, and in fact her kraut cutter and maul, were handed down to her from her father's side of the family, who came to this country from Bavaria in 1854.

The fat cabbages are carried down and piled on a low table in the cool, rock-walled basement of the house, where she prefers to work. The outer leaves are stripped away and the cabbage is split lengthwise so that the solid core and stem can be cut out. Then the cabbage is shredded a half-head at a time.

The cabbage slicer is like a narrow wash-board laid flat across the top of a crock. "When I have someone helping me," Mrs. Harrison says, "I will lay the slicer across a small wash tub and one of us can keep right on slicing while the other packs the crock." The slicer is smooth except for the two knives which slant up through a pair of slots. The cabbage is slid across the dark board, polished a smooth rich brown by thousands of sliding cabbage heads, and the knives cut off two crinkley slices which drop through the slots A new hand at the game will try to get the last fragment of cabbage through the slicer, but an old timer knows that it is safest to leave a pad of each half-head of cabbage and save slicing a knuckle. The chickens will thrive on these last pieces as well as the outer leaves.

The shredded cabbage is laid down in layers in the scalded, clean crock. A good sized head of cabbage is enough to make a loose layer three or four inches deep in a 10 gallon crock and that is just about right. The cut cabbage is then salted and ruffled up to let the salt work down in. Just how much salt to put on is no easy question to answer. Of course, you can go by the cook books and government pamphlets which say, "3½ tablespoons full to each 5 pounds of shredded cabbage," but a good cook goes by feel and taste. "I put on just a bit more salt than you'd want if it was a mess of slaw you were making—a couple of good, big, four-finger pinches to the layer. I don't suppose I'd use more than is in that salt dish over there—say a cup and a half—for a ten gallon crock of cabbage," Mrs. Harrison said.

After salting, the cabbage is pressed firmly down into the crock with a maul. Mrs. Harrison's maul, which was made by her father, is a sawed off length of cherry wood with one end whittled down to form a handle. "Don't use the maul to beat the cabbage, that would bruise it and you wouldn't get good crisp sauerkraut. Just press down firmly to make a good solid layer," Mrs. Harrison advises.

Layer after layer of shredded cabbage is salted and pressed down into the crock until the last tattered batch can be pressed an inch or two below the rim. This is quite full enough, for the cabbage seems to have the power to generate liquid like a flowing well. With good fresh cabbage this juice will rise to the top of the layer almost before the layer is fully pressed down. Over the top of the cabbage a clean cheesecloth is spread and tucked in around the edges and on top of this a board is laid and a weight put on top. Mrs. Harrison uses an old china plate, turned brown over the years, instead of a board and on it she carefully places a chunk of limestone which is covered with fossil shells and ancient crusty bugs. The plate and rock press the solid cabbage down as the liquid rises up to the rim and sometimes over the edge of the crock.

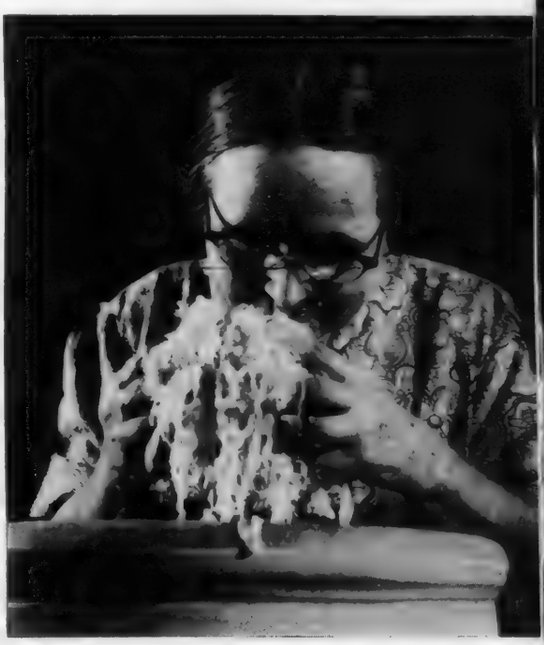
The cabbage starts working as soon as the crock is filled and keeps right on working for about three weeks, the fermenting smell gradually changing to the acid tang of real sauerkraut. During the time the cabbage is fermenting, Mrs. Harrison will look at it occasionally, but nothing more need be done to it. As soon as it is through working she takes up her twice-a-week job of washing the kraut. "If you don't wash the kraut," she said, "it will get too strong to be pleasant." By washing the kraut she means lifting off the cloth and with it the scum that forms on the top of the crock, washing out the cloth, and replacing it along with the plate and rock.

"I've heard of some folks leaving their sauerkraut out in the sun while it is working," Mrs. Harrison said in a voice that implied she was talking about the know-nothings of this world, "but that just makes a soft, mushy kraut that I certainly don't care for. I think the best kraut is made when it works in a cool cellar of about sixty to seventy degrees. Until this year when my arthritis got so bad I couldn't get up and down the steps, I always made sauerkraut in the cellar. This year I wasn't going to make any, but my daughter talked me into it. Said, what you should do with arthritis is to keep active, and making a batch of sauerkraut would probably cure me. So I made just a little dab in the kitchen and they carried it down to the cellar for me."

Mrs. Harrison's belief as to the best temperature for curing sauerkraut is supported by the findings of the scientists who are studying ways to improve silage making. Temperatures that range up to around 100 degrees invariably result in poor silage, they find.

With the coming of utility rooms in-

(*Continued on page* 94)



MRS. HARRISON slices her kraut on a cabbage cutter which has been in the family since she was a child. The cherry-wood maul, whittled for her by her father, is used to press each salted layer firmly into the crock. When the shredded cabbage has fermented for three weeks it is ready to eat. It's good either raw or cooked.

HUMUS

. . . the easy way

Big crops leave heavy residues that can be turned into humus

By James A. Rose

A LOAD of potential humus goes to the field. Manure, like other organic matter, must be reduced to humus before it can be used by a crop.

AS JOE KINNARD rode down the lane past his lower twenty he couldn't resist the temptation to stop and take a look at the growing corn. The crop stood row upon row without a shadow in the noonday sun. It was as high as an elephant's eye, all right, but it was firing badly, and the field looked like a vast slab of concrete. "This is the last time I'll try corn three years in a row," he told himself. "Land has to have organic matter and you can't get that without rotations."

A great many farmers and extension workers would be inclined to agree with Joe Kinnard, but the opinion is hardly unanimous. As a matter of fact, anyone who cares to investigate on his own soon runs into a very confusing situation. One soils man will say: "We spend millions of dollars on soil conservation, but what is soil conservation but the conservation of organic matter." Another will contend that continuous corn is a practice that is here to stay—"if we can only learn how to use organic matter efficiently." And then men like Roger Bray and S. W. Melsted out at the University of Illinois will further confuse the picture with the statement: "The first time we have ever maintained or increased organic matter in Illinois soils in a grain rotation was under continuous corn."

Any man who sticks his neck out like that should be prepared to defend his neck, and Bray is. Here's the way his view might be summarized: There is an important distinction between fertility and productivity. A productive soil has more than just the chemical elements needed by a crop. It also contributes a certain physical favorableness that we call tilth. A soil in good tilth has an open kind of struc-

ture; it is well aerated; it absorbs and holds moisture well; it doesn't clod up and it doesn't crust over after a rain. The soil conditioner people have been trying to develop special chemicals to provide this tilth.

Bray is of the opinion that nitrogen is the best soil conditioner any farmer can buy. He and Melsted also feel that the farmer should keep his eye on fertility rather than on tilth because, as they say, "When fertility is restored to soils, good tilth quickly follows." More of this a little later.

Virgin soils are always very productive. They are high in fertility and they have good tilth, largely because they are high in organic matter. As they are opened up and converted to agricultural use, the organic matter is destroyed and the soils lose their structure and become heavy and hard to work.

Obviously, the thing to do is to get organic matter, and lots of it, back into the soil. But this is more than a mere matter of quantity.

Before we get into this further, we have to understand that organic matter and humus are not the same thing. Organic matter is the broad term which includes undecomposed crop residues, stubble, roots, and manure together with the decayed material which is the humus. Humus, more specifically, is that part of the organic matter which has decomposed and has been reduced to a more or less stable condition in which it can release nutrients to crops. Organic matter must be reduced to humus before it is of any real value.

"Now," says Bray, and on this point there is general agreement, "there is no such thing as a 'good' level of organic matter or humus for a soil. It is ridiculous to think in terms of building up a soil from a two per cent organic matter content to, say, a four per cent content. Soils vary widely according to their location, texture, and origin in the amount of organic matter they can retain, and furthermore, the beneficial part of the material is always in an active state. It is the active organic matter as it decomposes that produces the very desirable crumb structure in the soil and gives it good tilth."

Enter Nitrogen

This is where nitrogen fits in. Among the many elements in humus, carbon and nitrogen are two of the most important, the carbon usually outweighing the nitrogen about 10 to 1. In crop residues the carbon-nitrogen ratio may run as high as 50 to 1. This means that without the addition of nitrogen these residues will be broken down to carbon dioxide and water, and only about one-fifth of the original mass will become humus. Also, in the process of decomposition nitrogen that might otherwise have been released to growing crops is tied up with another job, that of building humus. The first call on nitrogen is made by organic matter; what is left goes into the growing crop.

Sixteen years ago, Professor William Albrecht declared in "Soils and Men," the Department of Agriculture Yearbook, that "The restoration of soil organic matter is a problem of increasing the nitrogen level or of using nitrogen as a means of holding the carbon and other materials." This wasn't a particularly revolutionary statement even at that time. Under the prevailing condition, though, it did point up the necessity of using rotations. The question was where to get the nitrogen and the answer given then was to increase the use of legumes.

Sixteen years of progress in agriculture and the chemical fertilizer industry have enabled Dr. Bray to give the answer a different twist—use adequate treatments of synthetic nitrogen. The legumes are still valuable for their work in physically conditioning the soil, but whatever nitrogen they fix, he contends, is merely a by-product and not enough to supply the needs of humus building. Grasses, in his opinion, do even a better job than legumes in building organic matter and tilth because of their great mass of fibrous roots.

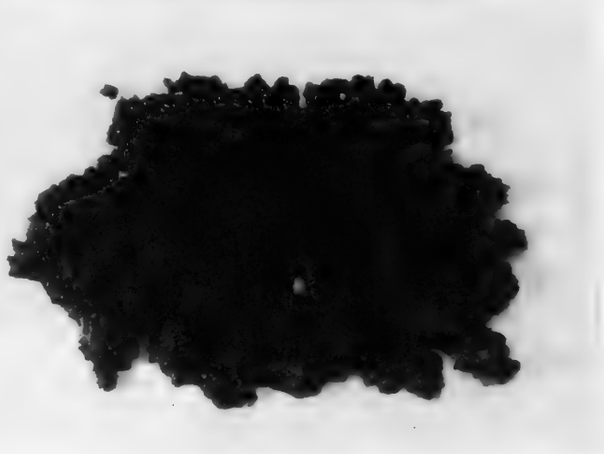
A COVER CROP seeded in standing corn and added to the crop residues the next spring will return up to four tons of organic matter per acre to the soil.

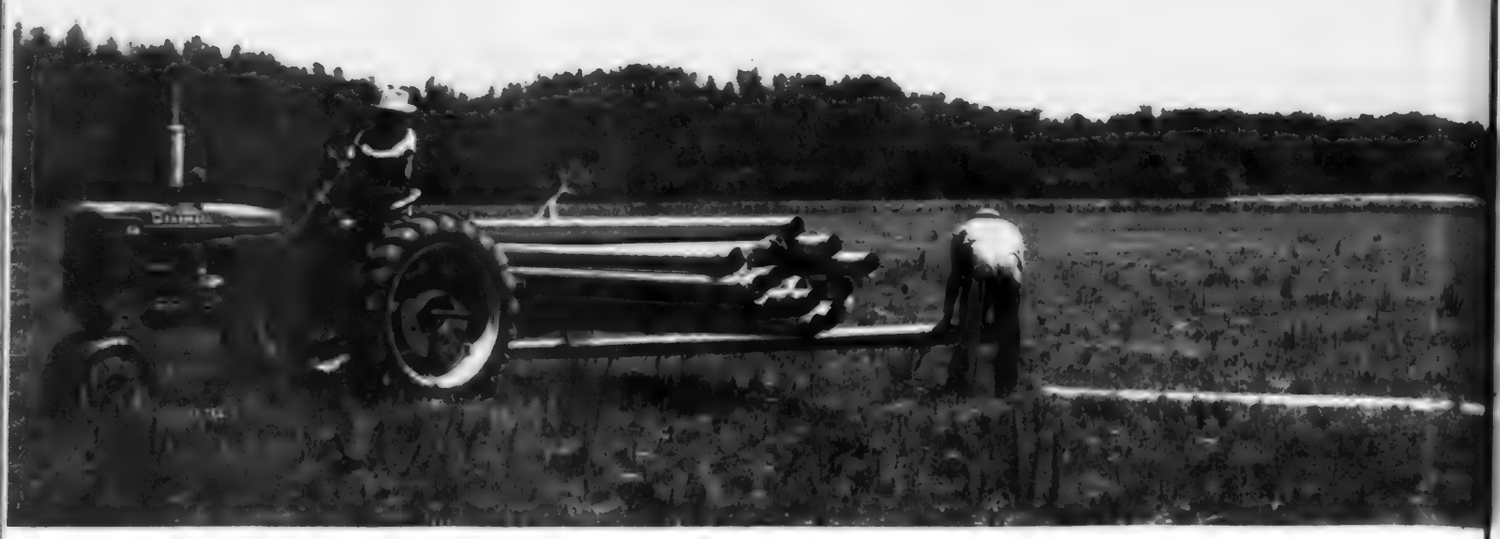
On the continuous corn plots at Illinois, held up as the example of the first cropping program to increase organic matter in the soil, rye was sown in the corn as a cover crop the last of August or the first week in September. Records show that the area around Urbana, Illinois, invariably has rain sometime during the first five days of September and the seeding is made at that time to take advantage of the moisture. The rye is cut with a stalk chopper the following spring when it is about knee-high and is then handled in either of two ways. It may be plowed down immediately with 200 pounds of nitrogen and the corn planted with a conventional type planter; or the rye is left on the ground as a mulch and the corn

(*Continued on page* 104)

SOIL LACKING organic matter is also in poor tilth. It becomes a sticky, tight, concrete-like mass when saturated with water.

VIRGIN SOIL, rich in organic matter, and in good tilth remains open and porous when submitted to the same test.





When Should I Irrigate?

IRRIGATION in the Midwest is a new thing to most farmers and it brings new problems. Not only must the beginner learn how to irrigate, but when, and how much water to apply. This is something grandfather didn't figure out for him. Perhaps in the far-distant future, when agricultural prices are so high that a farmer can afford to have a permanent irrigation system covering his whole farm, he won't worry about this particular problem; he'll have an automatic control very much like the thermostat in his living room which will turn the water on when it is needed and turn it off when the irrigation is completed. As a matter of fact, there is a device in existence today which will do just that. Day and night this electronic hired man can check the moisture of half a dozen plots and turn on the sprinkler system and pour the water to any of them that need it. The machine is no spendthrift with water either; when it has sprinkled a plot to the point where the moisture is down to the root zone, it shuts off the water and goes on about the business of checking the other plots for signs of dryness.

This is no dream gadget, but a rugged and tireless instrument built around a very practical moisture meter. The inventor of the automatic irrigator, Dr. George Bouyoucos, Research Professor at Michigan State College, has tested it for three years without a breakdown or failure of any kind. The only reason it isn't practical for today's farms is simply because Dr. Bouyoucos hasn't yet taught it to move a main water line or to shoulder a lateral and carry it across a field. In greenhouses or orchards, where a permanent sprinkler system covers the whole area, the device is ready to take over.

On the large farm where the irrigation system must be mobile and cover many fields, Dr. Bouyoucos' device *can* make one important contribution today. It can offer its brain to solve two of the most vexing problems in irrigation; when to water, and how much water to apply.

Out west where irrigation is a must and a farmer usually gets a limited amount of water for a limited period of time, his solution to these questions is to water as much land as he possibly can while he has the water—and these farmers who have grown up with irrigation have a sixth sense about how much water it takes to keep the crop growing. In the east where irrigation is a new thing, farmers have tried following a rigid schedule worked out for them by the irrigation engineer which tells them when to water and how much to put on the land, or they have tried to judge for themselves by the feel of the soil. Some have waited, and watched the crop for signs of thirst.

Lon Gleason, who irrigates over 100 acres of corn and hay land from a 35-acre lake on his big central Indiana farm, is still looking for the answers to these questions. When he was asked at an irrigation conference how he decided when to irrigate, he laughed and said: "I just walk out in the field and kick a big clod. If it explodes into dust, I know it's time to start sprinkling." Gleason is only half joking when he says this. He has been working with water off and on since he was a child some 40 odd years ago and used to collect empty spools from his mother's sewing basket to use in the construction of water wheels on the creek. More recently, he has built the big lake and has had two seasons of irrigation, but he has yet to whip the problem of timing.

"Our first project was to learn how to use our system efficiently. After all, we have a fixed cost of over seventeen hundred dollars a year in interest, depreciation, and repairs whether we use the equipment or not. To me, that means that we have got to keep the equipment in operation every minute we can and use our water economically to keep our cost down. I found out last year that irrigation pays

when we harvested a measured one hundred and forty-six bushels to the acre off an irrigated plot. Now our job is to give as much of our crop as we possibly can the water it needs without wasting any. That means finding out when to irrigate and how much water to put on."

Field Capacity and Wilting Point

The reason no one has come up with a simple rule of thumb for time and amount of irrigation is that there are almost as many soil types and soil conditions as there are farms in America. And each soil differs in the amount of water it can hold and the amount it can give to the plants. Clay soils, for example, are misers. Because of the fine structure of the soil they hold a great deal of water, but it takes a drying oven to get it all out of them; a plant wilts and dies while the clay soil still has some 30 to 40 per cent moisture. With sandy soils, on the other hand, it's easy come, easy go—they don't have the capacity to hold much water, but what they have they give easily to the plants.

Soil scientists have described two soil moisture conditions which are the boundaries within which plants can grow. The wettest of these conditions is called field capacity. By this is meant all of the water the soil will hold against the pull of gravity: that is, the moisture which remains after the flowing water has percolated out of the soil. If, because of poor drainage or the application of too much water, the soil has more than field capacity for a period of time, the air will be flooded out of the soil pores and the crops will suffer or may even drown.

The condition which marks the lower moisture limit is called the wilting point. This is the point at which plants can no longer draw water from the soil. When the soil reaches this stage of dryness, the plants wilt, stop growing, and eventually die.

The amount of water which the soil holds at each of these stages differs with the soil type. A light, sandy soil will hold around an inch and a quarter of water in each foot of soil at field capacity and give up 80 per cent of it to the plants, that is, all but a quarter of an inch of water to a foot of soil at wilting point. Heavy clay soils may hold as much as four inches of water to each foot of soil at field capacity and give up only 60 per cent of it to the plants.

When a field has between 40 and 100 per cent of field capacity, water is no problem. Just how much below 40 per cent you can go without the crop being retarded, the scientists haven't yet determined.

Moisture Tests

One of the tests which has been used to determine the moisture content of the soil was worked out by C. H. Diebold, of the Soil Conservation Service. In this test a bit of earth is spaded from 12 to 14 inches below the surface of the soil and squeezed in the hand into a ball—the squeezing is about as hard as would be necessary to milk a hard milking cow. If the soil won't form a ball after three or four squeezes, it has less than a fourth as much readily available moisture as it would have at field capacity and should be irrigated. If a ball is formed, the soil has at least one-fourth capacity. The ball is then tossed about a foot in the air and caught. If it breaks and crumbles after five such tosses, the soil contains from one-fourth to one-half field capacity—again it is time to irrigate. If the ball holds firmly together after five tosses, there is more than one-half readily available moisture.

Such a test is a rough one which only approximates the true state of affairs. In sandy soil, for example, a ball of earth may not be formed even at one-half field capacity, whereas clay soil may form a good solid ball at near wilting point. If all of the factors were known, the system of irrigating by schedule could be very accurate. In addition to knowing the field capacity and wilting point for the particular soil, a farmer would have to know the amount of moisture consumed by the particular crop in his area—corn, for instance, which has a peak water use of three-tenths of an inch of water per day in central Ohio, may run as high as four-tenths of an inch consumed in western Iowa. He would also have to keep accurate track of rainfall. With these figures he could know the total amount of water in the soil and the amount withdrawn by the crop and keep constant check on his balance. When an irrigation system is planned, the engineer usually makes up a schedule of use for the system.

The moisture meter developed by Dr. Bouyoucos, which also serves as the brain for his automatic irrigating system, is the most accurate device we have for testing soil moisture. The basic principle involved in this system has been known for a hundred years. It is that electricity will flow more readily through moist material than it will through dry matter. In attempting to use this electrical characteristic, soil scientists tried burying two electrodes or pushing them into the soil and then reading on a meter the resistance in the soil to

(*Continued on page* 86)

THE PLASTER BLOCK, left, encases electrodes which are the sensitive feelers for the moisture meter, center. A youngster can read the meter's dial, which shows the percentage of moisture available to the crop. The durability of a ball of earth thrown into the air, right, can be used as a rough test for soil moisture.

FEEDING

For Fattening and Growing

By Chester Charles

"We *grow* cattle," say the Caldwells of Iowa. "We *fatten* them too." There's a big difference. Walter "Pop" Caldwell, the elder of the clan, says, "Growth or fat on a steer can come out of the same feed bin or the same silo. But your profits may not come out alike. It depends on a lot of factors—the age of the cattle, the market, the feed you have."

The Caldwells don't own a single brood cow. They buy feeders like most Iowa beef producers. But they have found that it pays to "set a different table" according to the age and kind of cattle they are handling.

"One year we have a lot of good roughage," Caldwell says. "That year we stress a growing program. The next year we may have more corn in the cribs than we have hay in the mows. So we fatten older steers. If you keep your operation flexible by bending with conditions, you're less likely to go broke."

But they don't deviate from one procedure: all crops are marketed through beef cattle, with no in-and-out speculation. They are doing well at it with fairly standard corn belt methods, with a few twists.

"Sure people are turning corn cobs and citrus pulp and other waste roughage into fat cattle," Caldwell agrees. "But they are doing it with a particular type of cattle. Here's the point: when it comes to cattle rations, you can't separate feeding management from feeder selection and market plans, if you expect to make a living with beef. Take baby beef—you can't produce it from scrub calves and you can't produce it from roughage. On the opposite end of the scale, you don't see the corn cob and urea school of feeders trying it on choice light calves."

The Caldwells feed all kinds. The center of their operation is a group of three feed pens, a growing pen, a warming-up pen, and a fattening pen, which are really sections of a large cemented lot, with a system of moveable gates allowing any section to be increased or decreased as the need arises. Most cattle go through all three pens. Others, according to age and condition when received, by-pass one or both of the first two pens. They can handle about 600 at a time.

For the growing pen, Caldwell keeps two simple facts in mind: (1) *Growth gains are cheap gains.* (2) *You can't beat good roughage as the basis for growing rations.*

The 200 or so mixed stockers in Caldwell's growing pen early this spring were still on a ration basically composed of silage. Molasses was available in open troughs at all times. Salt and minerals were also fed free choice. After the silage and concentrates were consumed by the steers, a little hay of inferior grade—about a pound a head—was put in the feed bunks to occupy the attention of the less aggressive cattle until the evening feeding. The concentrate, scooped on top of the silage, was limited to 4 or 5 pounds a head. This is what they mix for a growing concentrate: 800 pounds of crushed shelled corn, 150 pounds of molasses, 200 pounds of soybean oilmeal, 100 pounds of cottonseed oilmeal (they choose whichever oilmeal is cheapest, but prefer a mixture of them), plus 15 pounds of urea and 20 pounds of mineral. This adds up to a 19 per cent protein mix. Five pounds of it per head offers a little more than the protein minimum advisable. "They might not need all of it, but a little excess offers protection and stimulates appetites," this farmer believes. His supplement is not far off the Purdue Supplement, which a lot of farmers are finding will increase silage consumption from the 25 pounds a head daily of a few years back to the 40 pounds a head we feed nowadays.

Caldwell follows recommendations for calves, which need 2¾ per cent of their weight daily in legume hay or its equivalent to gain the 1¼ to 1¾ pounds rapid growth expected. However, a 500 pound calf can't eat 14 pounds of clover hay (2¾ per cent of 500 pounds), for he doesn't have the rumen to handle it. He'll not take much over 10 pounds. So a pound of corn or other grain concentrate must be substituted for each two pounds of hay omitted from the ration.

THE GROWING RATION shades into the fattening ration. There should be more of the latter, and it should be lower in protein.

REGARDLESS OF AGE, if an animal gets more feed than it takes to grow and maintain him, the excess goes into fat.

WHEN to start pouring on the feed, when to market at peak finish, can't be learned out of a book; that is in "the eye of the husbandman."

As the calves go to yearlings they need 2½ per cent of their body weight in legume hay or its equivalent. That's just about their roughage capacity. So an all legume hay diet for them is fine—except that it will cost too much. The normal procedure is to cut the hay to one per cent of the yearling's body weight and to feed silage and straw to make up the rest of the roughage. For example, a 700-pound steer will consume and do well on 17½ pounds of legume hay daily, with nothing else. By limiting this to one per cent of his body weight, or 7 pounds of hay, the addition of about 12 pounds of silage plus 3 pounds of straw will cheapen the ration without lowering the rate of gain.

While this Iowa farmer depends on silage rather than hay, he considers five pounds of legume hay as a standard for comparison in modifying the ration.

In the opinion of the Caldwells, the substitution of a little grain for part of the roughage in a growing ration is desirable. It offers two advantages. Growth is more rapid and the grain-oilmeal mix permits a better distribution of the protein to the cattle. When protein supplements are spread on roughage without the bulkiness of grains, Caldwell finds that the boss steers go along and pick it all out.

(*Continued on page* 96)

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Today farmers are building longer life—*years* of it—into their barns and other pole structures. And they're getting this added serviceability at much *lower* long-term costs. PENTA*, the *clean* preservative, makes farm construction *last* because PENTA-treated poles *resist* termites and decay *effectively*—and keep that resistance for years.

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Costly repairs and replacement are held down to rock bottom. Your time is spared for your other farm projects. Be sure to ask about clean *PENTAchlorophenol when you buy pressure-treated posts or poles—and check on the use of PENTA-treated wood for loading ramps, hayracks, truck and spreader bottoms, feed racks, cribs. If treated wood is not available in your locality, treat it yourself. You can get more PENTA information simply by mailing this coupon to THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

R. F. D.

(*Continued from page* 59)

The mail was filed in a slotted shelf in front of the driver. The reins came through slits above the shelf. It could be closed tightly against the elements, but the windshield could be dropped and the sliding doors opened in pleasant weather. During the winter the carrier usually placed a lighted kerosene lantern between his legs to keep him warm. His lunch reposed under the seat. In those days the more elegant carriers wore a uniform, somewhat reminiscent of what was worn by our boys in blue during the Civil War. It was a trifle stuffy for hot July and August days, and was gradually discontinued.

The standard mail "hack" in turn gave way to the automobile. Fred. J. McKeown, Giddings, Texas, started carrying the mail on pony back in 1903 and is about to retire this year after 50 years of service. He acquired a two wheel cart which he used when the Texas roads dried out. "During the winter rains I often had to swim my pony across streams and if I wasn't careful he could drop into a mud hole up to his belly."

He thought a Model T Ford could get around as the roads improved, and he bought one in 1917. But he had to be pulled out of so many mud holes by friendly farmers that he went back to his pony for a few years more.

He passes daily the one-room school house which he attended, and four of his schoolmates are on his route. In the early days, before telephones were common, he was often asked to send the doctor after he got back in town. He still does a brisk business toting packages from town and to neighbors.

The old-time mail carrier periodically had a very knotty problem—what to do with his horse once he was through with him. A horse which had been used for any length of time by a mail carrier was ruined forever after as a driving animal. He wanted to stop at every mailbox along the road, and what was more frustrating, slowed up as soon as he saw one; he was reluctant to travel any road other than his old mail route. No one ever got anywhere on time with an old R.F.D. horse. The daily 20 to 30 miles of an average route soon took the ginger out of a horse, but he was still good as a family horse long after he was unfit for a mail route. Gypsies or traders usually bought the mail horses, at a very low price, and peddled them to suckers in strange neighborhoods.

A growing number of special cars are being made for the rural mail carrier. These have a right-hand drive which permits reaching the mail box without sliding across the seat. They are equipped for easy and convenient storage of mail and packages.

When parcel post came along, the duties of the carriers were more than

doubled. Packages up to 70 pounds were handled. The Post Office Department adopted a larger mailbox, capable of handling the larger packages, and asked the carriers to push them. However, there are still many small rural boxes. When the carrier has a package larger than the box will accommodate, he may deliver it directly, if it is convenient. Otherwise, he leaves a note asking the patron to call at the post office for it, or to meet him at the box the next day. He cannot leave it outside. A carrier dare not take mail from a home which is quarantined. He must deliver a special delivery letter up to half a mile off his route. The Department requests that he not leave his mail out of his sight, although it is doubtful if there would be a prosecution should a carrier be invited into a home for a chicken dinner.

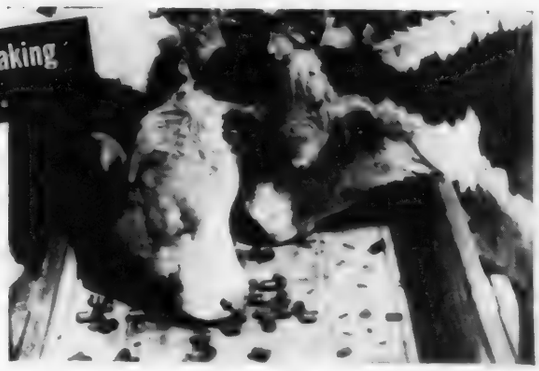
A carrier gets 13 days vacation a year for less than 3 years service, 20 days up to 15 years service, and 26 days after that. He is allowed 13 days sick leave per year with pay.

Rural mail delivery blankets the country today. There is scarcely a family, however isolated, that doesn't get its mail delivered regularly. Some isolated mountain communities are still served by pony express. In the bayous of the South, where there are no roads, the mail is sometimes delivered by boat. Claude Underwood is one of the carriers down there. His route, in Baldwin County, Alabama, is served entirely by boat. He starts at Magnolia Springs, going through Weeks Bay and up the Fish River. He moves from one side of the river to another in his six-cylinder boat, "Jeanetta," stopping at docks, boat houses, and at boxes nailed on trees. He sometimes has to dodge alligators, and keeps an eye open for snakes. His route is a little over 22 miles long, with 68 families.

Rural carriers have an exhuberant national organization, The National Rural Letter Carriers' Association, with headquarters in Washington. Their patriotism takes no back seat, even to the D.A.R., and they have a zealous pride in their organization and membership. Each state has its own tight little association. The carriers have a death benefit association, the Rural Carriers' Provident Guild, and a social organization known as the Retired and Pioneer Carriers' Club.

In Washington the politicians come and go, but the rural mail carrier, oblivious to everything except the prompt and regular delivery of his mail, goes his appointed way. There are few who would challenge the statement that no government worker does a better job of serving the citizen.

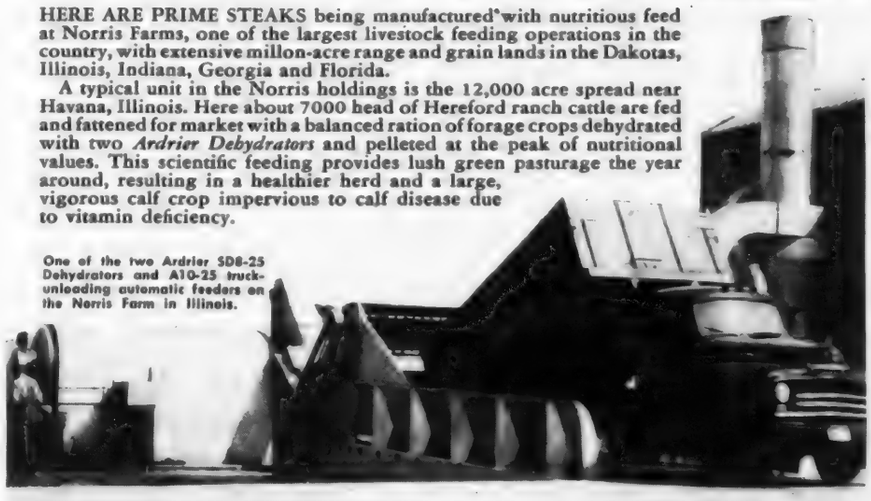
PRIME STEAKS in the making at Norris Farms . . .



Pellets produce healthier cattle, bigger calf crop for large raiser

HERE ARE PRIME STEAKS being manufactured with nutritious feed at Norris Farms, one of the largest livestock feeding operations in the country, with extensive millon-acre range and grain lands in the Dakotas, Illinois, Indiana, Georgia and Florida.

A typical unit in the Norris holdings is the 12,000 acre spread near Havana, Illinois. Here about 7000 head of Hereford ranch cattle are fed and fattened for market with a balanced ration of forage crops dehydrated with two *Ardrier Dehydrators* and pelleted at the peak of nutritional values. This scientific feeding provides lush green pasturage the year around, resulting in a healthier herd and a large, vigorous calf crop impervious to calf disease due to vitamin deficiency.



One of the two Ardrier SD8-25 Dehydrators and A10-25 truck-unloading automatic feeders on the Norris Farm in Illinois.

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At this Norris Farm operation, the production cost of year 'round "green pasture nutrition" for their stock is estimated to be *half of what they paid for pellets before they made their own.* By processing forage crops with Ardrier Dehydrators, larger tonnage is produced per acre because no leaves are lost and there is no spoilage due to bad weather. *All* the crop is used and protein, vitamin and mineral content is fully preserved.

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SOYA BEAN HAY	field cured	2 to 3 tons	9% to 14%	3%	200 to 600% more
	cut green and dehydrated	2 to 4 tons	18%	3.6%	
ALFALFA HAY	field cured	approx. ½ ton more	10% to 15%	2%	500 to 700% more
	dehydrated		17% to 24%	2% to 3%	

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WITH THE

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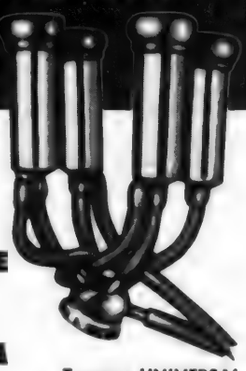

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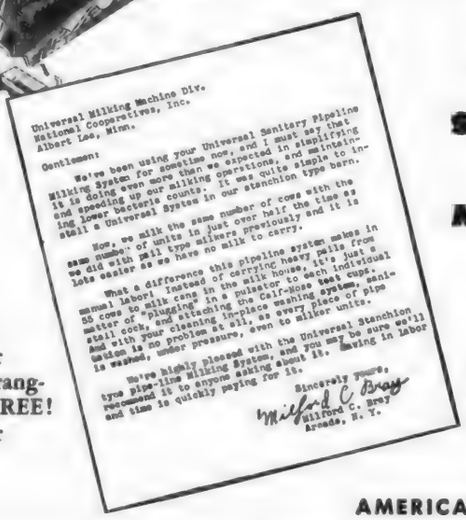

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Now, we milk the same number of cows with the same number of units in just over half the time we did with pail type milkers previously and it is lots easier as we have no milk to carry.

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We're highly pleased with the Universal Stanchion type pipe-line Milking System, and you may be sure we'll recommend it to anyone asking about it. Saving in labor and time is quickly paying for it.

Sincerely yours,
Milford C. Bray
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HOW PRACTICAL ARE METAL BUILDINGS?

(*Continued from page* 53)

fully considered answer to the building needs of the farmer is the pole barn.

The sheets that are now recommended for farm construction are 24-gauge, embossed and corrugated with a ½-inch valley and 2½-inch corrugation. They are made of the best aluminum alloys and if applied according to instructions will defy the worst attacks of wind and weather. A roof of this sheeting can carry a load of snow up to 20 pounds per square foot.

Clarence Duttlinger, a central Indiana dairy farmer, built a 65x90 pole frame aluminum-covered cattle shed last year because he figured it saved him about 15 per cent on construction costs. A year's use has convinced him that he made no sacrifice of strength, convenience and durability for economy.

"Forty-five mile an hour winds have had no effect on this building," he says. "I've been in it in high winds and it stood just as steady and tight as if it had been built of brick." Pole frame aluminum buildings have been known to survive tornados that leveled everything else in the immediate vicinity.

The aluminum pole barn is built in bays 15 feet long and 13 feet wide. A popular size is the 52x60 building, materials for which, lumber and aluminum, can currently be purchased in the Midwest for less than $3,000. Construction of this barn takes an estimated 300 manhours.

It is entirely open on one side, usually the south; is built on pressure-treated poles; has a side wall of pressure-treated 2x6 tongue and grooved, end-matched lumber 4 feet high to protect the aluminum from contact with stock and manure. It has a 13x12 door at each end and a walk-in door on one end. The superstructure is formed by nailing 2x10 supports directly to the treated poles and 2x10 rafters are laid on end on the supports. The purlins and girts are of standard 2x4 lumber. Forty-eight-inch aluminum sheets that come in lengths of 8 to 12 feet are used for both the roof and side and are attached to the frame with 2½ inch spiral shank aluminum nails fitted with neoprene washers. The floor is usually dirt; hay is stacked right on the ground. Stock are fed by means of movable feeder fences.

This same theory of the union of aluminum with pressure-treated lumber has been applied to the construction of machinery centers, poultry houses, and a variety of other farm uses. Condensation is held to a minimum in the open type of building, but if there is any possibility of its causing trouble, the designers of these buildings suggest laying paper under the sheets.

In these buildings, as in other corrugated structures, translucent plastic sheets can be used in roof and sides very effectively for lighting.

How Do They Compare?

The metal building manufacturers are putting on an aggressive campaign to gain farmer acceptance of their product and most of their points go without rebuttal. Cost of material, they are willing to admit, is usually more for steel and aluminum than for lumber or concrete; but, they say, annual maintenance is lower. This will depend, as has already been pointed out, on the quality of the metal and the material with which it is coated. Manufacturers of galvanized buildings generally recommend that they be painted every five to seven years. Aluminum should last a lifetime without any kind of covering.

Most of the new designs for metal buildings are versatile. They furnish an all-purpose structure that can serve a variety of uses. In this period of great demand for grain storage thousands of them are being purchased for this particular use with the intention of later converting them to machinery or livestock shelters. The wide, post-free, clear-span feature of the rigid frame buildings is a real boon to the farmer with big equipment to store. The government approval of a five-year writeoff of the cost of new grain storage facilities is making the purchase of these all-purpose buildings an attractive investment at this time. When surplus grain no longer poses a storage problem they can be converted to other uses with few, if any, changes. A building originally constructed with the metal sides brought all the way down to ground level can later be converted to a livestock shelter by installing kick boards to a height of four feet.

The speed and ease with which prefabs can be erected and the ease with which they can be expanded when the need arises are very valuable features. The extra cost of the material is often completely outweighed by the savings afforded in construction.

Their resistance to fire is another asset not to be overlooked. But the farmer should not be too gullible in accepting the salesman's claim that his insurance rates will be cut materially on a metal building. The insurance rating bureaus of most Midwest states make no rate distinction at all between metal outbuildings and those of other forms of construction.

Should you put up a metal building? That is a question only you can answer. Check the prices of competitive materials—lumber and concrete—in your locality. Shop around among the various metal building fabricators. Do a little traveling to see a few installations, if possible, and get the first-hand opinion of the man who owns one. Spend some time in determining just what you need in the way of a building. Ask a lot of questions about condensation and maintenance. In the end your satisfaction will probably be in direct proportion to the hours and thought you have devoted to planning your purchase.

Manufacturers of Metal Buildings

Great Lakes Steel Corporation, Stran-Steel Division, Detroit, Michigan (Quonsets)
Behlen Manufacturing Company, Columbus, Nebraska
Armco Drainage & Metal Products, Inc., Middletown, Ohio
Martin Steel Products Corporation, Mansfield, Ohio
Cowin and Co., Inc., Minneapolis, Minnesota
Butler Manufacturing Company, Kansas City, Missouri
United Steel Fabricators, Inc., Wooster, Ohio
Howard Steel Company, Davenport, Iowa
United States Steel Corp., Pittsburgh, Pennsylvania
Wonder Building Corporation of America, Chicago, Illinois
International Steel Company, Evansville, Indiana
Reynolds Metals Company, Louisville, Kentucky
Kaiser Aluminum and Chemical Corporation, Oakland, California
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Roofing and Siding Sheets Only:

Continental Steel Corporation, Kokomo, Indiana
Wheeling Corrugating Company, Wheeling, West Virginia
Armco Steel Corporation, Middletown, Ohio

Customized

USF STEEL BUILDINGS with Prefab Economy!

CUSTOM LOAFING AND FEEDING BARNS

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CATTLE LOAFING SHELTER

New Deluxe **40' CLEAR SPAN RIGID FRAME ALL STEEL BARN**

SINGLE OR MULTIPLE MANY VARIATIONS POSSIBLE

All USF Steel Buildings give you the greatest flexibility in design variation by adapting standard prefabricated units to your exact needs. You can customize at prefab prices. Exclusive Clip-and-Wedge sheet attachment speeds erection . . . eliminates all screws, welding, riveting and hole drilling. WRITE FOR LITERATURE on this complete steel building line.

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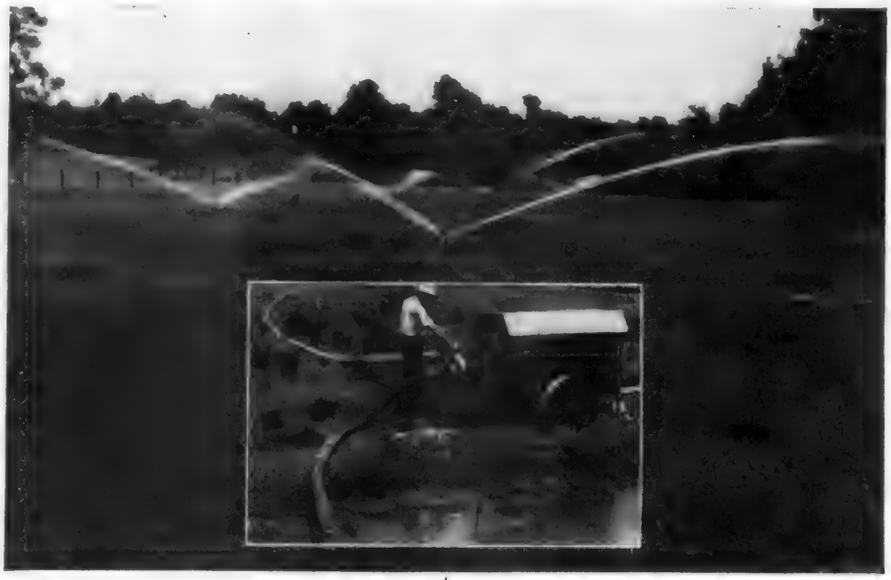
UNITED STEEL FABRICATORS, INC.

220 GASCHE STREET • WOOSTER, OHIO

BOOSTS YIELD 6 TO 1 WITH PORTABLE IRRIGATION



Simpsonville, South Carolina—Mr. J. T. Goodwin tried irrigating just 20 acres of his beef cattle farm with lightweight Alcoa® Aluminum Pipe and reports spectacular gains. His grass pasture land that was irrigated yielded 6 times more than other fields that were not irrigated. His beef cattle increased in weight—brought better prices as a result of irrigation.

Mr. Goodwin says, "Without portable irrigation, I would just stop raising cattle."

Mr. Goodwin employs about 2000 feet of Alcoa Aluminum Pipe in varied sizes from 6" to 3". He uses a gun-type sprinkler to cover large areas—draws water from a dredged creek using a converted tractor engine to power his pump.

Uses Superior Pipe

Backbone for the most reliable sprinkler systems is Alcoa Aluminum Pipe. The development of exhaustive tests, it is made from a superior, heat-treated alloy that withstands rough and continued usage. It needs no painting. Only one-third the weight of comparable steel pipe, it has a smooth inner surface that assures free-flowing performance at minimum pumping pressures. Available through leading systems dealers, Alcoa Aluminum Irrigation Pipe comes in diameters to suit individual system requirements. To identify pipe made to these rigid specifications, look for the blue and yellow Alcoa label on the pipe you buy.

Whatever your crop is,
Wherever your State,
To add to your profit,
Just irrigate.

FREE BOOKLET

Mail coupon below for Alcoa's *Pipelines to Profit* Booklet containing helpful facts on planning an irrigation system for *your* farm.

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Please send me a free copy of *Pipelines to Profit.*

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City _____ State _____

HIGH PROTEIN CORN

(*Continued from page* 42)

boosted anywhere from .45 per cent to as high as 4.12 per cent over the protein content of the rest of the corn.

One of the farmers who carried on this experiment, Earl Beers of Delaware County, Ohio, tabulated a set of results that show how effective a shot of nitrogen can be. With his usual fertilizer program, Beers raised 80 bushels to the acre with a protein content of 8.80 per cent. On the plot where he plowed down 40 pounds of nitrogen to the acre his yield jumped to 100 bushels with a protein content of 12.92 per cent. In addition to raising 20 extra bushels, the nitrogen increased his total protein by 329 pounds per acre. Adding this much protein in the form of soybean meal would have cost anywhere from $16 to $32, an amount that is several times the cost of the nitrogen fertilizer.

Nitrogen shortage in the soil will lower the yield and the protein content of high-protein corn just as surely as it will of the lower protein hybrid corn or, for that matter, open pollinated corn.

High Protein Corn for Cattle

When the first figures were in on the beef cattle feeding tests of high protein corn one of the University of Illinois scientists became as nearly enthusiastic as a scientist will allow himself to be. "This looks like one of the big things in cattle feeding," he said and then made the inevitable qualifications of a man whose life is one of unbounded restraint, "if these figures bear up under analysis."

The figures showed that a group of yearling steers fed almost entirely on high protein corn and high protein corn silage made faster and cheaper gains and sold for a higher price on the open market than did steers fed regular corn and silage and a group fed corn, corn silage, and soybean meal. Both the regular corn and the high protein corn were raised on the University farm. The high protein corn was given a side dressing of 150 pounds of ammonium nitrate at the second cultivation and yielded 65.5 bushels to the acre, which was just a little over two bushels more than the regular corn which was not given the extra nitrogen. Tests during the growing season, however, showed that both the high protein corn and certainly the regular corn were being held back because of a lack of nitrogen. And this was the catch that made the picture not quite so rosy.

When the figures for this experiment were analysed and the scientists compared the high protein corn with a normal yield of regular corn, it was found that the yield of beef on the basis of acres of corn was not as great for high protein as it was for regular corn. In yield tests over the years, the high protein corn produced substantially less grain and somewhat less silage than regular hybrid corn.

High Protein Corn for Pigs

It is with the nonruminants that the *quality* of the corn protein shows up. Whereas cows and other ruminants are able to make use of very poor quality protein or even nitrogenous material such as urea and convert it into a balanced protein in their bacteria-loaded rumen, other animals such as pigs and chickens must eat a balanced protein. That is, the protein which they eat must have all the amino acids—the building blocks which make up the various proteins—which are essential to life. The protein in regular corn is somewhat lacking in two of these amino acids, lysine and tryptophane. It has now been found that as the corn protein is increased these two amino acids form a smaller per cent of the total so that the protein in high-protein corn is even less in balance than in regular corn. This is true whether the protein content has been raised by breeding or by the addition of nitrogen to the soil.

This imbalance of protein comes about because increasing the protein in corn is done by increasing one of the proteins called zein. Zein, which, incidentally, is finding a wide use in industry in the production of synthetic fibers, is almost totally lacking in the amino acids lysine and tryptophane—two of the ten amino acids which are known to be vital to growth. For this reason corn, even a 20 per cent protein corn, could not supply all of the amino acids needed by pigs and chickens. When fed a protein lacking both lysine and tryptophane, these nonruminants lose weight; when one of these amino acids is given as a supplement, the animal can hold its own, but fails to grow; when both are supplemented the animal grows vigorously. It is the lack of these two vital amino acids which makes it necessary to supplement the corn with a protein containing them no matter how high the protein content of the corn may be.

It would seem that the cheapest way to add the amino acids to our poor-quality corn is to breed a corn which produces a balanced protein. Some plant breeders feel that this might be possible and are going ahead with the complex testing and selection of seed. Other scientists believe that the problems raised by such a project are so great that it is next to impossible.

What are the Breeders Doing?

At the Iowa State College, lean, white-haired Dr. G. F. Sprague and his associates take the optimistic view that corn with a balanced protein may be a possibility. At least, Dr. Sprague has been patiently working on such a project for the past fifteen years. His attitude toward the present high-protein corn is summed up in his comment, "If high-protein corn is of value only to ruminants, it isn't really of much value at all. For we know, of course, that we can increase the protein content of cattle feed simply by adding urea. Our

Experiment Station Tests Prove Heat Robs Farmers!

Agricultural experiment stations throughout the country have proved that hot weather takes the profit out of poultry raising. Heat reduces feed consumption, lowers growth rates, cuts egg production, egg size and shell strength. Broilers come to market with less fleshing. Heat prostration kills both broiler and laying flocks.

Inside Temperature	Result	
100° - plus	Extreme danger. Use emergency measures at once.	
95° - 100°	Heat prostrations most likely. Consider emergency measures.	
90° - 95°	Greatly reduced feed consumption; heat prostrations may be encountered among layers but very few among broilers.	
85° - 90°	Further reduction in feed consumption; increased water consumption; only slight danger of heat prostrations.	
80° - 85°	Slight reduction in feed consumption: no danger of prostrations.	
70° - 80°	No danger.	

DANGER ZONE chart, based on study made by leading state agricultural college, shows that even normal summer temperatures in the 80° are bad for birds.

Alcoa® Aluminum Roofing Your Best Protection!

Aluminum roofing keeps out up to 95% of the sun's heat rays, lowers poultry house temperatures as much as 15°. Birds are kept cooler and more productive when temperatures range into the normal summertime eighties, have a better chance to survive when they soar into heat-wave nineties.

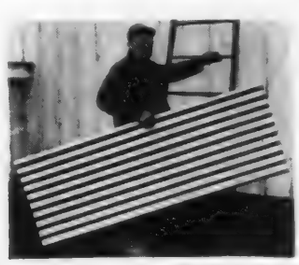
Alcoa Aluminum Roofing protects your pocketbook in other ways, too. The alloy from which it is made is a product of 29 years of experiments to develop greatest corrosion resistance. It combines light weight for ease of construction with rugged strength for increased holding power. Produced under rigid quality controls, each sheet is inspected after each production step to insure uniform high quality.

If you're planning to build or re-roof your poultry houses or any of your farm buildings, see your local Alcoa Roofing dealer.

He can help you estimate your needs, give you helpful application tips, see that you get the most for your money—Alcoa Aluminum Roofing. ALUMINUM COMPANY OF AMERICA, 2114-F Alcoa Building, Pittsburgh 19, Pennsylvania.

EXPOSURE TESTS in all parts of U. S. prove new Alcoa Aluminum Roofing has greatly increased corrosion resistance, longer life.

OWNER REPORTS losing only 58 broilers under aluminum roof like this, 960 under ordinary roof during summer heat wave.



LIGHT WEIGHT of Alcoa Aluminum Roofing speeds construction; strength allows open decking—savings in lumber for sheathing.

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Please send me (free of charge—without obligation) the Alcoa *Farm Roofing Manual*.

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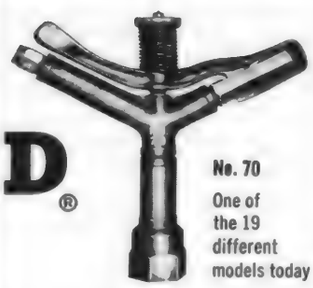
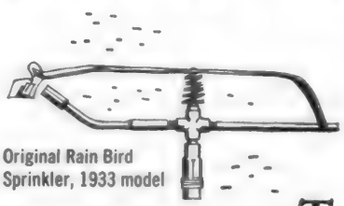
Built by

RAIN BIRD®



No. 70
One of the 19 different models today



Original Rain Bird Sprinkler, 1933 model

THE first Rain Bird sprinkler, built in a barn in 1933, was a crude affair...but it set the pace for modern irrigation. The swinging spoon-type arm—originally made by hand—has made irrigation practical on *all* types of farming lands and crops. Before this, sprinklers were used only when no other form of water application was possible. Rain Bird's swinging, spoon-type arm distributes water evenly over a maximum area. That's why you'll find Rain Bird sprinklers used around the world...wherever irrigation can solve a nation's food problem.

THE GOOD EARTH—EVEN *BETTER* WITH RAIN BIRD!

Rain Bird Sprinklers conserve soil and water as avidly—but with better purpose—as a miser hoards his gold. They apply water uniformly over the entire field and, by controlling the length of time of operation, will apply water to the proper depth. Thus, Rain Birds save water, plant nutrients and fertilizers and eliminate alkali build-up on soil surface.

CROPS—BETTER, TOO!

Rain Bird increases production with its uniform application of water to the proper depth over the entire field, promoting feeder root growth throughout the upper soil surface, thus insuring strong, more productive plants.

STILL THE LEADER!

Rain Bird's spoon-type, one-piece arm, open spring and simple, efficient bearing have contributed tremendously to the growth of the irrigation industry. Today, more than 20 years of constant research and development are your assurance that Rain Bird is still the leader with the newest, more efficient methods of sprinkler irrigation. Insist on Rain Bird—accept no substitute—and be sure of dependable performance. Also, be sure that the sprinkling system you get meets the standards set by the American Society of Agricultural Engineers and fits your needs exactly.

Our research and planning department is at your service. Consult us today without obligation.

Member of American Society of Agricultural Engineers and Sprinkler Irrigation Association.

NATIONAL RAIN BIRD SALES & ENGINEERING CORP.
AZUSA, CALIFORNIA

RAINY SPRINKLER SALES, 609 WEST LAKE ST. PEORIA 5, ILL.

real problem with protein comes with the nonruminants. If we are to supply a large part of this protein in the form of corn we must either improve the quality of our corn protein or find suitable supplements to supply the lysine and tryptophane."

Though Dr. Sprague has found some varieties of corn which are low in zein protein and therefore higher in the balanced protein which is contained in the endosperm of the grain, and though he has contributed a great deal to our understanding of the inheritance of protein, oils, and other characteristics in corn, he is far from ready to come out with a corn with a balanced protein.

As far as beating the problem of low yield is concerned, plant breeders are much more optimistic. As one of them put it, "If there were a strong demand for high-protein corn on the part of farmers, we could produce a high-yielding variety in a relatively short period of time."

As the situation stands today, a farmer can have high yields and high-protein corn by applying plenty of nitrogen to the crop. The greater amount of protein, however, will not be balanced—it will do very well for cattle and sheep but must be supplemented when fed to pigs or chickens. If he plants the corn that has been bred for high protein, he will get an even greater amount of protein, but will have somewhat lower yields.

In the future there are three possibilities in this field: (1) A high-yielding high-protein corn; (2) synthetic lysine and tryptophane to supplement the corn protein; (3) a high-protein corn with a balanced protein.

WHEN SHOULD I IRRIGATE

(*Continued from page* 77)

the completion of the circuit. Results of these tests were very spotty and it was soon discovered that the soil structure was influencing the tests as much as was the moisture content. If the soil was loose and friable, there was poor conductivity even when it was also moist; if it was compact there was less resistance. "I remember the moment I solved this problem," Dr. Bouyoucos said recently in the pleasantly blurred accent which is a reminder of his Greek childhood. "I was driving along in my car not thinking about anything in particular when I noticed two silos on a farm. I thought 'If only I could enclose electrodes that way.' Then I said, 'Why not?' I drove right back to my laboratory and fixed two electrodes into a plaster of Paris block. From the first, it worked."

The plaster of Paris absorbs the soil moisture and also gives it up at the same

GORMAN-RUPP PUMPS

Always Ahead of the field - - -

Model 54A-VG4D
4-inch pump

First with — Shaft seal under suction, virtually ending seal failures in the field.

First with — Removable end plate, for quick access into pump without breaking pipe connections.

First with — Overall operational safety — each unit has adequate protection controls. Standard.

First with — Large drum-type fuel tank — three times usual size.

First with — Suction and discharge on horizontal plane, simplifies hook-up.

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First and Always with — Farm engineered units; pump most efficient at engine's best range. Every unit proven in practical farm use.

Gorman-Rupp — First among sprinkler irrigation pumps, provides complete package units: pump, engine, exhaust priming device, strainer — **ready to go to work.**

A SIZE FOR EVERY SYSTEM

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SPECTACULAR YIELDS
this season

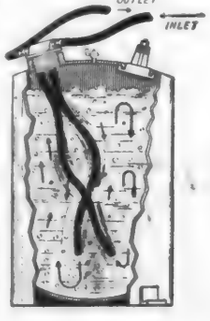
GUARANTEED by complete foliar feeding through your sprinkler irrigation system

a NEW kind of farm implement . . .

FERTILEZE FARM FLOW MIXER!

Turn your pressure-type irrigation system into an amazing new kind of fertilizing unit . . . an efficient one-man operation that will save you time and money *while it builds crops of superior quality and productivity.*

Agricultural experts have proved the advantages of complete, progressive feeding—*throughout the growing season*—in limited amounts. The new FERTIL*EZE* Farm Flow Mixer enables you to accomplish just that . . . simply, quickly, economically . . . with your existing irrigation equipment! The Flow Mixer thoroughly mixes soluble fertilizers and introduces them into your sprinkler system. Your crops, pastures and orchards receive adequate nutrition *when and where they most need it.*



The rugged FERTIL*EZE* Flow Mixer works from your pump on a turbo-mix principle. It has no moving mechanical parts and it is built for years of reliable no-cost service. In addition to soluble fertilizers, the Flow Mixer applies lime, gypsum, weed-killers, insecticides and even seed.

positive ALL-SEASON crop control . . .

N.C.I. SOLUBLE Mineralized FERTILIZERS

Soluble N.C.I. Fertilizers were developed specifically for economical progressive feeding . . . costing 25% to 50% *less* than other soluble fertilizers of equivalent analysis. Six basic N.C.I. formulas provide every major element combination required for all soil and crop conditions . . . plus every secondary and trace mineral known to be essential for plant, animal and human health.

These are the specially compounded fertilizers about which Louis Bromfield has written enthusiastically in leading farm and garden magazines—and has used with spectacular results at his own famous *Malabar Farm.* No matter what fertilizers you have already used, there's a balanced N.C.I. formula to give *you* superior crop health and productivity. Packed in 50-lb. polyethylene-lined sacks.

MAIL COUPON TODAY FOR ILLUSTRATED GUIDE TO SUPERIOR CROPS THROUGH PROGRESSIVE FEEDING

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Agricultural Division **P.O. Box 309, New Lexington, Ohio**

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rate as the soil around it. When a charge of electricity is passed through the system the meter records the number of ohms of electric energy it takes to pass through the block. If the soil is at field capacity, 700 ohms will overcome the resistance; if it has reached the wilting point, it will take 100,000 ohms to overcome the resistance of the dry block. In the meter which was designed for soil scientists, Dr. Bouyoucos has left the reading in numbers of ohms; in the somewhat simpler meter designed for farm use, the reading is in percentage of available moisture. That is, 100 per cent represents field capacity and zero represents wilting point.

In actual farm use, two or three of the blocks are buried at different depths at representative spots on the field. The wires leading to the block are labeled to show the depth of the block and are then fastened to a stake where they can be found easily and also kept out of the way during cultivation. A reading can be taken in a matter of seconds and will show the percentage of field capacity at each depth. When the moisture in the root zone has reached around 50 per cent of field capacity, the farmer will start irrigating. The exact point at which irrigation should be started will be different on each farm and will depend on how rapidly the farmer can cover his field. If it is found that the field can be covered quickly then there would be little danger in waiting until the moisture content went a little below 50 per cent, but if it takes a good while to cover the field a farmer should start when moisture has reached 60 per cent or he is likely to wind up with part of his crop injured.

The depth at which the tests are made is very important. Contrary to our old beliefs, water does not move upward through the soil—at least with anywhere near enough speed to satisfy the needs of a growing crop. At the U.S.D.A. Soil and Water Conservation Research Station at Coshocton, Ohio, careful tests showed that a corn crop could use up the water in the top 14 inches of soil until it was near the wilting point without taking much moisture from the soil below. Plants will wither and die if they don't have water at the root zone even though the soil may be at field capacity a foot or two below.

When these facts are considered there seems little reason for putting on enough water to wet the soil below root depth. "We have found that the water that goes much beyond the depth of the roots never returns," Lloyd L. Harrold, head of the Coshocton station said. "And we also found that water percolating down through the soil carries a lot of nitrogen, potash, and lime with it so that a farmer who over-irrigates not only wastes water but wastes his fertilizer as well. So, how deep should you water? That depends on the crop. Four inches will do if the crop is strawberries, but the corn crop will draw most of its water from the top two feet and trees will need water down to three or four feet." The blocks at different depths are just as useful in deciding when the water should be shut off as they are in indicating the need to start irrigating.

The Bouyoucos blocks and meter are not the only moisture-testing device on the market today. A west coast firm, T. W. Prosser Company, 3695 Main Street, Riverside, California, is manufacturing a moisture indicator called an Irrometer. This device is essentially a glass tube filled with water with a dial at the upper end and a porcelain plug in the lower end. As the water is pulled through the porous clay plug in the lower end, the dial registers the tension exerted. Using this system it is necessary to have tubes of different lengths to reach the different soil depths. These tubes cost from $20 to $25 depending on the length of the tube. The Bouyoucos instrument, incidentally, is distributed by the Wood and Metal Products Company, Bloomfield Hills, Michigan. The plaster blocks sell for $1.50. The old meter sold for $78.00 and operated on alternating current supplied by batteries. Dr. Bouyoucos has now devised a simpler meter which operates on direct current, also supplied by batteries, which will be on the market this summer selling for considerably less.

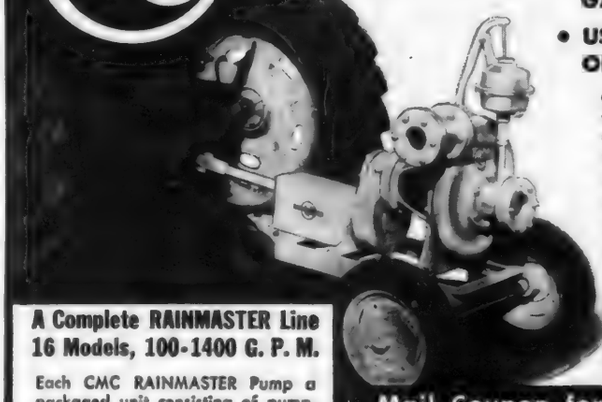
Dr. Bouyoucos converted his meter into an automatic irrigator by adding two movable arms to the dial. These arms are

set by the farmer, one at the percentage of available moisture at which he wishes the system to start watering, and the other arm at the upper limit where he wants the water shut off. The meter is able to put the farmer's wishes into practice by activating a solenoid valve on the water system. In order to have one meter check the moisture in a group of plots, Dr. Bouyoucos had the moisture-testing blocks in each of the plots connected with a device with a sweep arm. As the arm sweeps around the face of the device it touches the contacts connected to the moisture-testing blocks and connects them with the meter to determine the moisture content of the plot. When the meter shows that the plot needs watering, the sweep arm stops and the solenoid valve turns on the water. After the plot is irrigated to the point desired, the water is automatically shut off and the sweep arm goes on checking the moisture content of the other plots.

Though the automatic irrigator is a thing of the future, the meters available today will help us save water, save money, and produce better crops.

BIGGEST IRRIGATION NEWS IN YEARS!

NEW! RAINMASTER TRAC-TOW PUMPER



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- USES POWER TAKE-OFF ON 20-30 H.P. TRACTORS

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Unitized construction — integral speed increaser. TRAC-TOW a ready-to-run package, no extras to buy, no parts to assemble.

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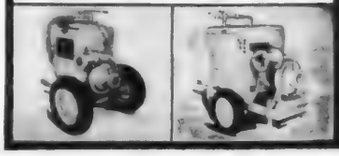
Each CMC RAINMASTER Pump a packaged unit consisting of pump, close-coupled to power plant complete with priming devices — ready to operate. Write for full details.



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Gentlemen: Please rush me FREE information on the New TRAC-TOW Pumper.

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SAVES 80% of your Labor!

- *Eliminates disconnecting, carrying and re-connecting lateral sprinkler lines.*
- *Ideal for permanent pasture and certain field crops.*
- *One man operation. The wheels carry the load.*

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The SHUR-RANE® Engineered Wheel Type Sprinkler System

Now you can have all the wonderful advantages of sprinkler irrigation . . . richer, season long pasture and more abundant harvests regardless of natural rainfall . . . *with 80% less labor.* Lines are moved in minutes, with manual drive or with power drive. Save feed. Increase production. Investigate this latest addition to the famous SHUR-RANE sprinkler equipment line.

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Gentlemen: Please send me complete facts on SHUR-ROLL and SHUR-RANE portable irrigation and the name of my nearest dealer.

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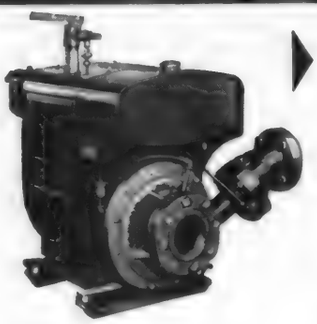

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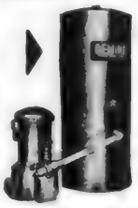

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Skinner Sprinkler irrigation means efficient, effective irrigation. Water is applied only when and where needed . . . coverage is uniform . . . and penetration is just right to assure maximum growth.

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Farmers are assured of bigger and better yields on all types of row crops with Skinner Sprinkler irrigation. Dairy farmers and stockmen find that it gives them lush, green pastures during the dry season, increases milk production, lets them pasture more cattle on the same acreage.

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The SKINNER IRRIGATION Company
200 WATER STREET, TROY, OHIO

Above, Skinner Sprinklers help produce more and better corn.

Right, Skinner Sprinkler irrigation has increased milk production of this herd.

TOO HOT TO HANDLE

(*Continued from page* 47)

that at those levels which were necessary for the killing of insects the chemical was unsafe, it would never have been released.

Most of the tests were conducted on animals. But, unfortunately, no matter how carefully animals are studied this does not give us a positive answer as to how man may react to the chemical. We know of several chemicals and drugs which are specific for a particular species of animal —some day we are bound to run into one which is food for the rat, but poison to man. Knowing this, the late Dr. Paul A. Neal, the scientist who is credited with having done more testing of this chemical than any other man, offered himself as a subject for some of the tests.

He and another volunteer subjected themselves to aerosol sprays of DDT. They were carefully examined both before and after the test. When no harmful effects were noted, the two ran a second test using triple the concentration of DDT. At this concentration, which incidentally was far in excess of the amount needed to kill insects, Dr. Neal found that his eyes, nose, and throat were irritated by the spray, but medical examination showed that neither he nor his associate suffered any toxic effects.

His next test was to swallow 500 milligrams of DDT on an empty stomach. As with his earlier experiment, careful medi-

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cal examination preceded and followed the experiment which showed that there were no harmful effects from such a dose and also showed that the human body was able to change DDT into DDA. In a second test in this series Dr. Neal swallowed 770 milligrams of DDT on an empty stomach, again without ill effect.

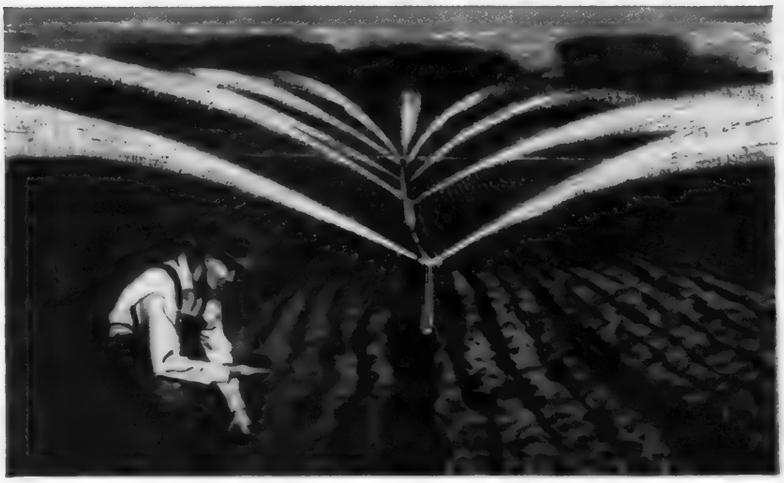
Testing did not stop with the release of DDT for use. Dr. Neal and other toxicologists continued to test workers who are normally exposed to large doses of the chemical such as chemical plant workers and professional spray men and have examined many people who have taken huge quantities of the drug in suicide attempts. In the State of Washington, a group of scientists are taking samples of human fat from professional sprayers to determine the amounts of DDT stored in the fat tissue and its effect upon the individual. Fairly large amounts of the chemical were found stored in the fatty tissues. The DDT was doing no harm here, but the question was raised as to what would happen if the person lost weight rapidly and had to draw on his fat reserves. Dr. Princi says of this: "With rats, we can cause them to lose a fourth of their weight in a matter of twenty-four hours and show signs of DDT poisoning from the material released from the fat. The question is purely academic with a human, however. If he were to lose anywhere near that amount of weight, he'd be dying of some other disease."

This thorough testing is true not only of DDT but of all agricultural chemicals put on the market. Such tests have been made on 2,4-D, Ammate, sodium arsenite, and the other herbicides, on mercuric chloride, copper carbonate, bismuth subsalicylate, and the other fungicides as well as on aldrin, TEPP, lead arsenate, chlordane, dieldrin, and all of the other insecticides which reach the market.

Such tests are time-consuming and costly. Dr. F. F. Heyroth, assistant director of the Kettering Laboratory, estimates that the tests performed on animals may cost from $25,000 to $100,000 and run from a minimum of two years on up to five or more. Most of these tests are made by private or university laboratories, like Kettering, to avoid even the suggestion that only findings which were pleasing to the manufacturer were reported.

In running animal toxicity tests a fairly uniform procedure is followed. The first problem is to determine how much of the chemical it takes to kill. Doses of varying amounts are given to rats and other animals (sometimes even guinea pigs act as guinea pigs) until the lethal dose is discovered. This is a quick, relatively inexpensive, but necessary test.

To determine the amounts of the chemical which can be absorbed through the skin, patches of hair are shaved from animals and their skin is smeared with different formulations of the chemical. Often it is found that the toxicity and irritant prop-



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says a farmer in the Great Miami River Valley, Ohio. "We'll average 1200 to 1400 dozen ears of corn to the acre with portable sprinkler irrigation. We'll get it to market earlier when corn's selling for twice as much."

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says a Missouri orchardist. "We applied 18 inches of water per acre to winter apples in the fall of 1952. They responded and grew so well we salvaged $25,000 worth of apples in spite of existing drought conditions."

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are gained by portable sprinkler irrigation," says a California dairyman. "I rotate pastures every day. And handling the lightweight pipe costs only about a dollar per acre for each irrigation."

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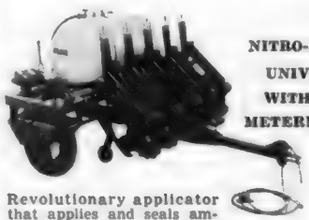

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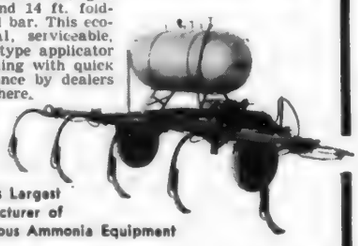

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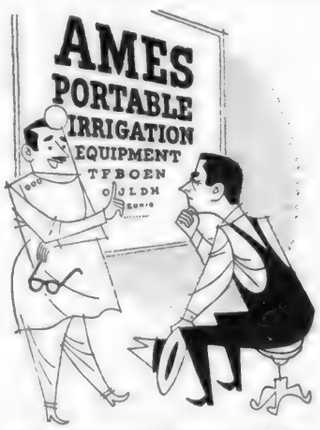
erties of a chemical are changed by the substance in which it is diluted. DDT, for example, is much more readily absorbed through the skin when diluted in oil than it is as a wettable powder or as a dust.

The inhalation tests require expensive equipment and are usually performed on collections of animals. The quarters for such a collective experiment are large glass cages which are connected to air and chemical intakes which control all of the air that enters. In one of these cages will live a dog, a cat, several rabbits, three or four guinea pigs, a half dozen white rats, and perhaps a dozen mice. It is not at all uncommon to see the cat snuggled next to a pair of sleeping rats and the dog sitting quietly nearby. "As long as they are all well fed," Dr. Heyroth explained, "there seem to be no 'natural' enemies among them. After a few months of such an experiment, the animals become extremely valuable to us, but we've rarely lost one to fighting." Each day the animals in each cage breathe a measured amount of the chemical being tested for a definite period of time. After several months they are taken out and examined for any effects of their ordeal.

Testing for possible poisonous residues is an even longer and more tedious job. For this test groups of rats—usually 40 to a group—are fed food which has been contaminated with varying amounts of the chemical being tested. Every day throughout its natural life each rat in each group will eat food, every bite of which has been contaminated with an exact amount of the chemical. Their rate of growth will be carefully noted and compared with the control group which is eating exactly the same food but without the chemical. The amount of food they eat and their efficiency in converting it into flesh is noted, blood tests and urine tests are made periodically and tests to see



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whether the material is being stored in the body and how it is being stored and whether it is being broken down. Breeding tests are run to determine whether or not the chemical has any effect on reproduction and the offspring are kept on the test to see if they are more susceptible than their parents. As each animal dies, an autopsy is performed and microscopic slides are made from tissue from every part of the body to determine whether the chemical is affecting any particular organ. Rats are usually used for these tests because of their shorter life span and ease in handling, but there are usually some dogs and monkeys tested along with them.

In addition to the animal tests, other groups examine the effect of the chemical upon the soil and the plants grown on it. They also test its effect on wildlife and bees.

When all of this information is gathered, the Department of Agriculture must decide whether to grant the manufacturer the right to label it and sell it in interstate commerce. The U.S.D.A. officials must decide whether the chemical is completely safe when properly used.

Though their decision covers an overwhelming majority of the chemicals sold on the market, there are still other checks to protect us. Most of the states have insecticide laws and the Food and Drug Administration has the power to confiscate any food shipped in interstate commerce which is contaminated with spray residues.

Just how much spray residue will be permitted to remain on agricultural products has been answered by the Food and Drug Administration in the past by informal standards of tolerance. At present there is a bill before Congress sponsored by Representative A. L. Miller, who is a doctor in private life, which is designed to formalize these standards.

These are the facts which should reassure the Quaker farmer who feared that he might be poisoning his customers. One is tempted to feel that, except for a little worry on the part of the overly conscientious, the frightening pictures painted by those who fear chemical sprays do more good than harm since they tend to keep us on our toes. This is not true, unfortunately. These attacks bring about counter-attacks which tend to make the farmer feel that there is no danger whatsoever from his sprays. This attitude leads to carelessness; and carelessness with poison sprays, needless to say, is dangerous to the farmer and to the nation which depends upon him for food.

The farmer must use sprays if he is to produce food. As Dr. George Decker, one of the nation's leading entomologists, has said: "We are just share cropping with insects as it is. Most farmers are raising more insect protoplasm per acre than they are pork or beef." The answer is that he must use the spray for the job it was designed to do and with the proper respect for its dangerous qualities.

The label on the container of chemical

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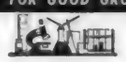

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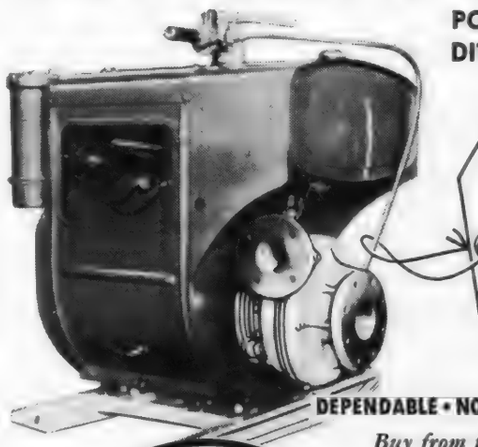

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spray material will tell what it is to be used for, how much it should be diluted and with what material, the precautions to be followed, and the emergency measures and antidotes to be taken if the material is dangerous. *If the label does not have all of this material printed on it, do not buy the chemical. If the container has lost its label, do not use the chemical.*

Insecticides can be used safely and they must be used if we are to do better than to share crop with the insects. Since DDT has been the chemical most commonly attacked, it might be well to pay this great insecticide its proper due. Since it came into use, it has stopped cold at least one outbreak of bubonic plague, protected our troops in World War II and in the Korean conflict (remember the stories of cooties and fleas in the first war?), and prevented no less than five million deaths and 100 million illnesses from such dread diseases as typhus, malaria, yellow fever, dengue, filariasis, encephalitis, and dysentery by killing the insects which spread these diseases.

SAUERKRAUT

(*Continued from page* 73)

stead of cellars and of compact, efficiency kitchens, there was bound to be a change in sauerkraut making. The change is one of containers. Instead of shredding the cabbage into a crock, it is put into quart jars. The same old procedure is followed, however; the shredded cabbage is put into the jar a layer at a time, salted, and pressed down. About three layers of cabbage with three scant teaspoons of salt are enough to fill a quart jar. When the jar is filled, the lid is screwed on loosely so that the cabbage can ferment without danger of a minor explosion, and the jars are set in a shallow pan to catch the overflowing juice. When the kraut has stopped working, usually after about three weeks, the jars are wiped clean, the lids are screwed down tight, and the sauerkraut is set aside until needed. When a jar of kraut is opened, there is a little scum on the top, which does no harm, but should be spooned off before cooking.

"I think that cooking kraut in its own juice makes it too strong," Mrs. Harrison said. "I put the sauerkraut in a saucepan and add just enough water to cover it. And I put in lots of grease. You might just as well not cook the kraut to my way of thinking if you aren't willing to put in plenty of grease to make it rich. I use two big spoonfuls scooped out of the lard bucket—that would be about a scant cup—to a quart of kraut. And I put in about a quarter of a cup of sugar too. I let the sauerkraut cook for maybe a half hour, certainly no longer because you can cook it to death, and then add just a pinch of soda before I take it off the stove."

And just as surely as butter goes with bread, a mess of sauerkraut calls for a dish of mashed potatoes. "I remember once a great aunt of mine dropped by around lunch time," Mrs. Harrison said. "She saw I was just about to start fixing some lunch so she said, 'Don't you go to any trouble on my account now. Why don't you just put on a little skillet of your good sauerkraut?' Well I did and then I said, 'My land, you can't eat sauerkraut without mashed potatoes.' So I put some potatoes on to boil and before we were through we cooked up a batch of spare ribs to go along with the potatoes and kraut. That's the way I was saved from going to any trouble, but it *was* a real good meal.'"

Another standard recipe that has stood the test of time is sauerkraut, neck bones and pig tails. The neck bones, with plenty of pork on them, and the tails, are boiled for about an hour and then the kraut is added for another 30 to 40 minutes of cooking. And the best known of all sauerkraut dishes, of course, is sauerkraut and weiners or smoked pork sausages. With this dish, the kraut is started first and the weiners or sausages dropped in for the last 20 minutes of simmering.

These are the dishes that we usually call the heart of a German meal. Though we think of sauerkraut as being as German as a stein of beer, the Germans didn't invent this method of pickling cabbage. It was the Tartars of Asia who made the discovery and spread the practice across Europe with their military forays. It was the Germans, however, who gave it appreciation and made the pickling of cabbage into an art. It is not surprising that it is a German proverb which says, "Sauerkraut and bacon drive all care away."

THE AUTHOR: Life in Mason County, a particularly pleasant part of Kentucky along the Ohio River, has been the inspiration for most of Mrs. Eleanor Cullen's writing. Until moving to Cheviot, Ohio, with her husband and two children last summer she was feature writer on the *Maysville* (Ky.) *Daily Independent*.

FARM BOOKS

(*Continued from page* 30)

and the plants which grow in it. This new edition of Soils and Fertilizers has been completely rewritten, not only to present the latest information on soils, but to achieve greater clarity on this most difficult subject. The result has been a bigger book which has been rearranged, particularly in the later chapters, to present the material in a clearer form. Among these later chapters the one on cultivation which discusses such matters as how deep to plow and the possible value of subsoiling, and the chapter on organic matter and the relation between humus and cultivation and also between humus and crop yields are worth the price of the book to the dirt farmer.

FEEDING FOR FATTENING AND GROWING

(*Continued from page* 79)

For growing calves and yearlings, four to six pounds of legume hay will supply the protein needs. When non-legume hay or silage is fed, as on the Caldwell farm, the protein must be supplied in concentrated form. Steers of any age in similar flesh require about the same amount. The same 1½ to 2 pounds of a 40 per cent oilmeal supplement recommended for a 400 pound calf is sufficient for a steer double that weight, for protein needs decrease as growth slows down. The required percentage is what goes down, so the same poundage is right as the animal's weight increases.

When the only roughage available to Caldwell is inferior hay or straw, he never lets it exceed 30 per cent of the total roughage given calves, even though supplemented with a protein concentrate. For long yearlings, which are better able to digest high fiber feeds, poor roughage may be as high as 70 per cent of the total roughage. A good practice is to feed at least four pounds of good legume hay per head, not only for low cost protein, but as vitamin, mineral, and carotene protection. The balance of the roughage can be of low grade and fed to appetite. Older cattle can be induced to eat more inferior roughage by spraying it with molasses, or by spreading the molasses-concentrate mix on the roughage, as Caldwell does.

Green Roughage

In summer, protein in the roughage is no problem. High quality legume and grass pasture is the best roughage of all. Says Caldwell, "Next to cow's milk, you can't find a better growing ration than pasture. But like a lot of other feeders, we prefer dry lot green feeding over grazing.

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Slow Change Over

The Caldwell steers are sorted at intervals. The pens are filled to capacity the year around and no attempt is made in selecting the feeders for uniformity. The growing pen ordinarily contains cattle in various stages of growth. When they have made some growth, which might be in one month or might be in six, they are shunted to the warming-up pen and fattening begins.

"It isn't often that we are able to find feeders of the baby beef type," Caldwell adds. "By those I mean choice, high-conditioned calves that have never lost their milk fat. Producers of those usually operate on a small scale and fatten them out themselves. You can't do it on roughage, as I've said. They are generally creep-fed from a few weeks of age. The few we pick up are either in the warming-up pen for a little while, or they go right into the fattening pen with the idea of getting them to choice or even prime at, say, 900 pounds.

"We buy native feeders, mostly from southern Iowa or northern Missouri. Our way, we can buy replacements any time of the year, and no matter how they have been handled, whether just weaned, wintered lightly, or partly pasture-fattened, they fit into our scheme somewhere.

"Usually we try to up-grade a notch or a notch and a half, from medium to good or low choice, for profit margin, naturally. We really buy mostly medium grade stockers. A stocker doesn't become a feeder, strictly speaking, until he is ready to fatten—after he has his growth.

"In the warming-up pen, where they stay about ten days, feed can't be just dumped in front of them. The amount of grain has to be controlled and steadily increased, so there we have to treat a group of steers as a unit. The roughage is cut down to about 20 pounds or less a head and the grain mix, still at the 19 per cent level, is pushed up to 6, then 8 and 10 pounds a day before the cattle can go in the fattening pen."

Fattening Rations

Fattening is essentially a case of easing up on the roughage and bearing down on the corn. In the fattening pen, the mix is changed to this one: 1100 pounds of crushed shelled corn, 150 pounds of molasses (also fed free choice here) with 40 pounds of soybean oilmeal, 20 pounds

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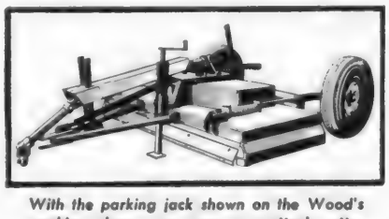

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of urea and 15 pounds of minerals. "That makes a 12½ per cent protein mix. For mature cattle where growth needn't be stimulated, that's enough. The *kind* of protein can be of lower quality as well, so we up the urea, cut down on soy and eliminate the cottonseed. But we continue the molasses as a binder and appetizer. And we drop the mineral five pounds per mix, for they don't need it like growing stock do."

The steers get only 10 pounds of silage in the fattening pens. That is about equal to 4 pounds of hay. "What's a rumen on a steer for, anyhow?" Caldwell asks, "—to digest bulky roughage. Take away the roughage, feed him corn only and protein and he'll fatten fast. But he won't chew his cud much and a lot of corn will go through him without being broken down in the rumen. It's wasteful. It ignores the purpose of the rumen bacteria, which convert cheap fiber feeds and the more fibrous parts of grain into digestible feeds. An all-grain diet makes a steer's liver act up. He'll develop boils in a few months, as soon as his vitamin and carotene and mineral reserves which he stores in his liver are used up. He can get the vitamins and the rest from green hay or good silage, but he won't get them from grain. So when we start pouring the corn to them, we still give them roughage. By cutting down on the amount you can trim their paunches some and that increases dress-out."

Most authorities recommend two pounds of silage per hundred pounds live weight as a maximum for fattening rations. In standard practice, three-fourths of a pound of legume hay takes the place of two pounds of silage. As with growing rations, 1½ to 2 pounds of a 40 per cent supplement per head daily takes care of the protein. The amount of minerals and salt present no problems if both are fed free choice. Caldwell believes in including 10 pounds of a trace mineral mixture in each half ton of standard bonemeal-phosphate-limestone mineral mix.

As for grain, wheat and barley, disregarding price, are close enough in feeding value to shelled corn or corn and cob meal to be regarded equal from a practical standpoint. With any of these grains, a steer is considered on full feed when he is consuming two per cent of his body weight daily. Where crushed cobs or other deficient roughage is supplemented with protein, molasses, minerals, and vitamin A, an animal is considered on full feed when eating three per cent of his body weight, for the roughage is of course in the mixture.

Fattening gains for Caldwell average 1¾ to 2½ pounds daily. He has a few remarks on that score as well. He says that in fairness you can't compare daily gains of one lot of cattle with another without taking a number of details into account. In general, the younger the cattle, the faster the gain. In *well-fed*

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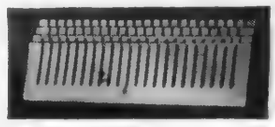

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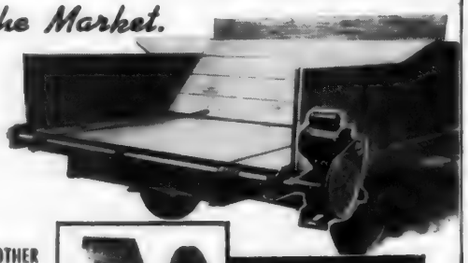

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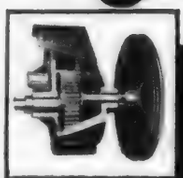

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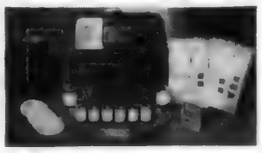

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cattle, the rate of gain slows down as they mature. Show stock gain over 2½ pounds a day as calves but gain less than a pound a day as two-year-olds. But take a bunch of *thin* mixed steers and put them on heavy corn for the first time and the result is reversed. The thin older steers with larger digestive capacities eat more in proportion to their body weight and they gain faster, often adding 2¾ pounds a day as compared to well below two pounds average daily gain for thin calves on full feed.

"When you want to make a record for daily gains," Caldwell points out, "start with thin, hungry two-year-olds. But you might not make out so well in the profit and loss department because gains put on a partly fat animal are the most expensive."

Fat Costs More

Why is that? A little of the theory of nutrition clears it up. In growing animals, growth gets first crack at the feed, after maintenance. Fat takes third place. It takes 2¼ times the amount of food energy to produce a pound of fat as it does a pound of growth in hide or bone or muscle. Fat always requires an excess of energy over and above growth needs. That's where grain comes into the picture. It normally costs more than roughage per pound, but it has a greater wallop of fat-producing nutrients. Roughage produces enough energy for growth of bone and muscle and when growth slows down, roughage can produce fat, but it takes too long. As Caldwell says, "While you are waiting for the animal to fatten on roughage, he's using up too much feed just keeping alive." However, you can put a fair kill on a mature steer with roughage alone, but not on a calf. He hasn't the digestive space to handle it. Where considerable roughage is to be used in fattening, older cattle must be used.

Caldwell keeps his roughage-grain ratio flexible too. When young growing stockers fill the pens, the silage chopper gets more than its annual write-off usage. With better grade feeders on hand, he is likely to begin heavy corn feeding at an earlier age, and the corn picker gets a good workout.

He doesn't expect to make choice beef on heavy roughage. He figures his operation will show a better profit and provide a well-balanced conservation program for his farm by feeding out more cattle on heavy roughage than he could handle if he put the emphasis on greater corn acreage and heavier corn feeding for a longer fattening period. His steers generally stay in the fattening pens for only 60 to 100 days before going to market. That gives his operation additional flexibility, for as he will tell you, "We don't have to stay within one program. It doesn't hurt us much if we have to hold the cattle a little longer for a better market."

3 GOOD REASONS FOR MAKING GRASS SILAGE

(*Continued from page* 41)

find one, who will walk ahead of the forage harvester and work the windrowed silage onto the apron of the harvester and in that way spot any stones, which may easily run up a $500 repair bill. The new forage harvesters will mow, chop and blow in one operation and have rubber belts that will take care of field stones.

Mow a little at a time, as much as you can fill in two hours. Then if you have a breakdown you won't be caught with 20 acres of grass wilting under a hot sun. Wilting is not necessary on a silage mix that is fifty per cent or more on the grass side. A field of straight young legumes should be wilted from one to two hours on a hot day because their water content is so high. Really sopping 80 per cent moisture silage that should have been wilted and wasn't is best cut an actual 2 inches long instead of going smaller, even if your harvester will do it. That annoying stink that goes with grass silage can often be traced to a wagon load of wet stuff left overnight that wasn't blown into the silo until the next day.

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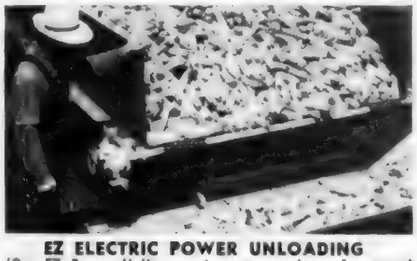

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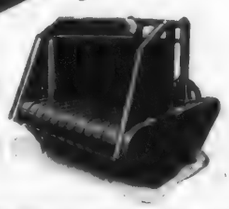

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thing is to chop a grass-legume mix fine—the finer the better. If the forage harvester has a theoretical set of one inch, use it. This means a field cut of two inches, which itself is too long. You can't cut it too fine. Air is the only enemy of silage, and with a fine cut less air will be trapped. When a fistful of silage clings tight in a ball, it is too wet to come in. It should open a little. If it flies open, it's too dry. Perfect is 65 per cent moisture.

As the silage is blown up the silo and wafts down, it picks up air on both trips. Only by chopping it fine can you hope for a tight pack. Tramping is hard work, a time loser, and messy. With the big, heavy 12-inch pipe vacuum blowers that feed in a ton a minute you don't need to tramp because the stuff is shot down the silo so fast it packs itself. On the smaller pipe outfits, tramping is old-fashioned insurance that farmers respect. They tramp every door full and close it on the way up. If you forgot to oil the sides on the way down, oil them as you go up. This keeps silage from sticking to the sides, peeling off from the mass, and trapping air.

Steel silos last their lifetime guarantee when grass silage is not held over two or three years in the bottom rings, but used up and the sides oiled.

Open-top concrete silos offer farmers a convenient way to save time when they're filled to the top. Erect a chicken-wire frame around the top, going up three feet beyond the top of the silo. You can fill the silo this extra three feet so that after settling the silage will be right at the top instead of a ring or two down.

What Preservative

Finding a silage preservative is like picking a preventive for a cold. If you're healthy, you don't need it. If everything is perfect, you don't need a preservative. If grass is 50 per cent of the mix and was cut before the head came out of the boot; if the legumes were just coming into flower and weren't tricked by the season into growing rank and stringy; if the forage harvester was working right and the cut in the field was under two inches; if you didn't have a mechanical breakdown that caused the silage to wilt three hours in the hot sun; if part of the field didn't get ahead of you and showed grass that was three feet tall and yellowing at the base—you can forget about preservatives.

In other words, if the silage is neither too wet, nor too dry, nor too long, nor too springy, you've got it made without a preservative. Otherwise, a preservative expands the range for making good silage. There is hardly any loss in money as preservatives (cob, corn, molasses, brewer's grains, dried molasses, corn cob meal, or plain water) are feed in themselves and if you put them in the silage you can deduct it from the ration later. If you put 5 per cent preservatives into a 100-ton silo, you are naturally ensiling 5 tons less of grass. Feed preservatives will lose about

15 per cent of their nutrient value in the silo.

Feed preservatives can be divided into two groups: one is used when the silage is too wet; the other when it is too dry. If fine-cut straight legume silage is not wilted in the field and comes in a sopping 75-80 per cent wet, 100 pounds of half-inch ground corn cob and 100 pounds of brewer's grains to the ton will save it.

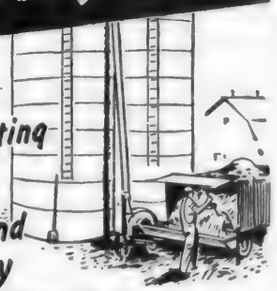
If you are in doubt because your silage is strong on legumes and on the wet side, add a sack of brewer's grain to the ton. Brewery men say: "When the grass is the greenest is when brewer's grains are down." This favors the grassland farmer who is filling two or three silos with grass, for he can buy a car of brewer's grains to his advantage right when he needs it. Adding liquid molasses to sopping silage at 8 gallons to the ton will quicken fermentation.

Ground corn and cob meal can be used as a substitute for ground cobs and brewer's grains in case of overly wet silage; or dried molasses itself is a good substitute.

When silage is a little on the dry side, (60 per cent wet) 100 pounds to the ton of any one of these preservatives will do: ground yellow corn, whole yellow corn, brewer's grains, brewer's grains and dried molasses.

Water itself is often added to silage that is too springy, too dry, or chopped too long, provided the silo has some drainage. Molasses at the rate of five to eight gallons

Attention Dairy Farmers!



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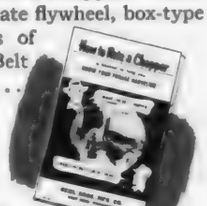

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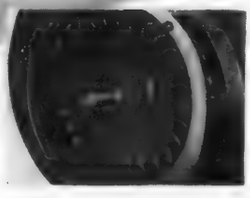

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No farm machine is any better than the *Power* that drives it. And efficient cooling, under all operating conditions, is one of the first essentials to *dependable power!* A large capacity fan, cast in the flywheel of every Wisconsin Engine, provides trouble-free cooling, even in the most extreme temperatures.

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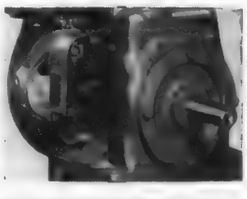
These self-cleaning, file-hard bearings take up all load thrusts, permitting the use of either chain-, belt- or gear-drive direct from the extended crankshaft, without fear of damaging main or connecting rod bearings. This does away with the need for an outboard bearing.



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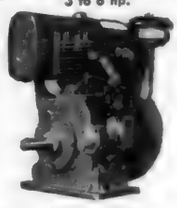
All single cylinder models (with exception of Model AEN) have pump-circulated level splash system. Model AEN and multi-cylinder models pump an individual oil stream to each connecting rod. Other parts are lubricated by oil spray, assuring complete and thorough lubrication for smooth-running and long engine life.

● 4-cycle Single cylinder 3 to 6 hp.



● Single Cylinder 6 to 9 hp.

● 2-cylinder 7 to 15 hp.

● 4-cylinder V-type 15 to 36 hp.

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to the ton, depending upon the dryness, will also prevent spoilage. Brewer's grains has this advantage over free-flowing molasses: there is less runoff of silage juices. The particles of grain swell up in the juices. When molasses is used, the farmer generally has to mix water with it to make it flow. This encourages a greater runoff of silage juices which, of course, have a nutritive value. Water and molasses works fine with silage on the dry side; but water and molasses isn't so good with silage on the wet side. In that case, dried molasses is best.

Differences of opinion prevail on the value of sodium meta-bisulfite as a preservative. Silage treated with this chemical at eight pounds to the ton will hold its bright green color and springtime odor. It loses less carotene, but silage is far heavier in carotene (Vitamin A) than livestock need. Whether sodium meta-bisulfite is worth the money in milk or beef gains is not yet conclusively proved by the string of experimental stations that have worked with it.

Grass silage has double the protein, carotene (Vitamin A) and minerals of corn silage. When grass silage is 50 per cent legumes, you can usually use a straight grain feed without fortifying it with a protein supplement, because legumes are so high in protein. When grass silage is 70 per cent legumes, increase the hay ration and cut out all protein supplement or the livestock, particularly dairy cows, may not maintain their weight.

THE PROGRESSIVE FARMER

(*Continued from page* 49)

without any results. I suppose that the balance of that summer I made as many as forty trials and each trial ended the same way, with not a particle of progress made.

I thought about getting John Cappes to help some day when the folks were gone, but the Cappes didn't have a binder and probably he wouldn't know any more about the machine than I did. Then there was always the danger that he might forget and say something about the machine, and the secret would get out.

At last I decided to write to Minneapolis where it was made, and ask them how to fix it. But how would you describe a thing like that! After four or five times at trying to write a letter I was so confused that I didn't even know myself what I was trying to say. So I gave that up too.

During the winter I even tried a couple of times to fix that binder. But it was so cold in the shed that my hands got numb and I was forced to give up. So I had to wait for Spring.

Along late in March I tried again. But it was simply no use. I couldn't budge the thing and I began to lose all hope.

Pretty soon it was mid-June and in

three weeks' time harvest would be here again. Then the whole monstrous truth would come out and I'd really be in for it. Every time I thought about it I could feel hot flashes run all the way up and down my spine.

About that time we had a lesson at Sunday school about "The Way of the Transgressor Is Hard." The teacher laid it on pretty strong and did his level best to bring out the main points in that lesson, but he didn't half do it justice. I could have told him things on that subject he had never dreamed about.

About the first of July things began looking so black that I began to pray in earnest. I would go away off in some quiet place and plead with God to show me how to fix that confounded binder. Once I rode a mile or more into the woods to be sure I was all alone. There I bared my troubles, confessed I had done wrong, and begged for help. I tried reading the Bible to see if I could get any light but I never found a thing in there about binders, or any kind of machinery. But I did stumble onto a passage where people were told to do their praying in a closet, so I decided to try that.

That night, when everybody was sound asleep, I slid out from behind Frank, slipped down stairs and cat-footed it to the closet. I went right in and shut the door behind me. Then I got down on my knees and did some real praying. I felt

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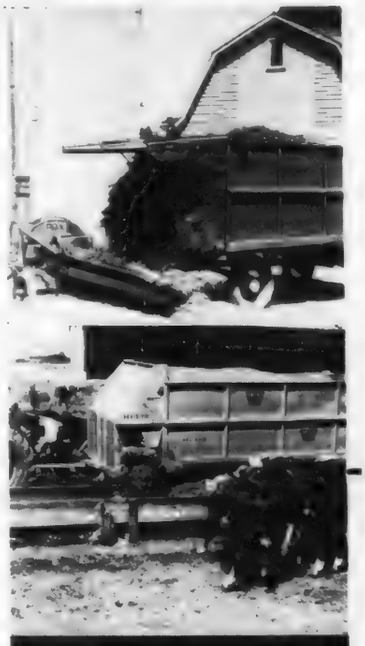

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Make your forage wagons do more for each dollar invested. Use a Helix side delivery Cross-Conveyor to speed up feeding chores... save time. New design feature permits removal of elevator for filling low bunks or working in cramped quarters.

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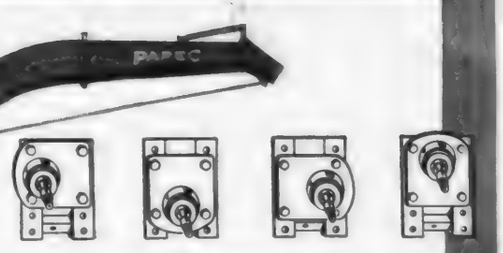

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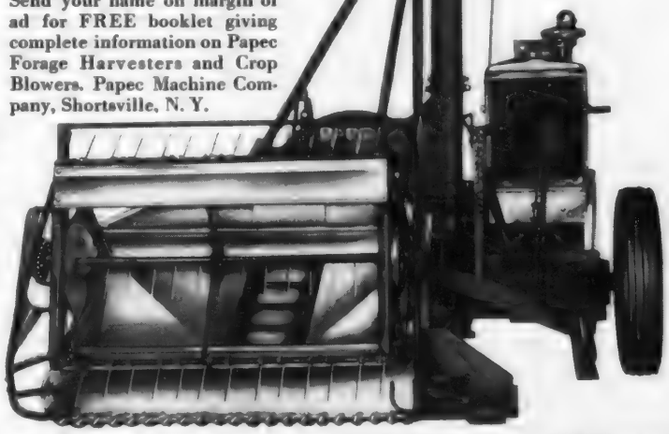

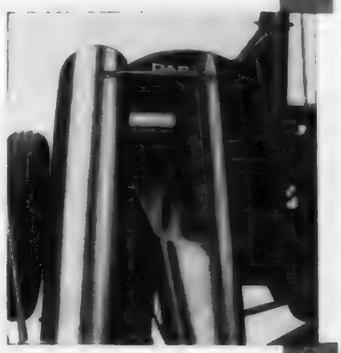

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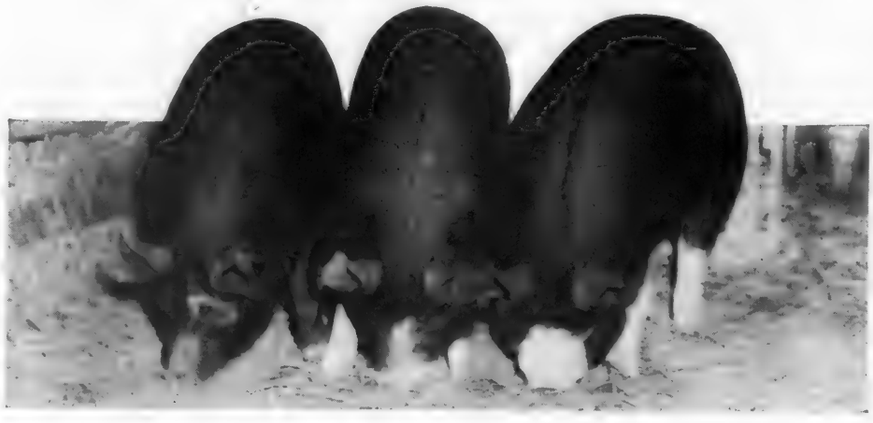

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SACCO V-19 MINERAL FEED

sure I was going to get somewhere now, as I was following out instructions to the letter. I admitted I had done a great wrong, pleaded for mercy, and asked for light on the subject that had been bothering me so long. Then I went upstairs to bed again and had a fairly good sleep.

Next morning, long before getting up time, I was out at the shed, trying my hand again on fixing that binder. I set my eyes on that set of cog wheels in front, and wiggled the handles, first one way and then the other. Pretty soon my eyes fell on a trigger sort of thing that was resting against a lug. I raised the lug up, so the trigger didn't touch, and, believe it or not, the handles came free so I could turn them backward. When that lug came around again to where the trigger caught on it, I lifted it again with the same results, and in another minute or two I had the handles back where they belonged. Then I clapped the cog wheel back in place and the binder worked as well as it ever did.

No one knew how relieved and thankful I was. My heart filled with gratitude to God for the help He had given. It may seem a small thing for God to get interested in, but He knew that to me it was the biggest kind of case and amounted to far more than running a government or straightening out some other mess.

When we moved the binder out of its shed a week later, Frank noticed that the oil can was toppled over on its side and told me to straighten it. But I pretended not to hear him and just left it lying there. I would not have tried to change anything about that binder for the best horse in Iowa.

THE AUTHOR: "Progressive Farmer" is a chapter from the book, OLD ORCHARD FARM, by Hugh Orchard, published by the Iowa State College Press. The 85-year-old author, now a resident of Cedar Rapids, Iowa, was raised on the Des Moines County farm that is the subject of his book. He was the twelfth in a family of 14 children. In 1890 he accepted a call as Christian Minister at Scranton, Iowa; twenty years later became active in the promotion and management of a chautauqua circuit covering Iowa, Minnesota, the Dakotas, Missouri, and Arkansas. Between times he studied law and was admitted to the Illinois Bar, served as editor of the Galesburg, Illinois, *Spectator,* and did a stint over an Iowa radio station as "The Country Editor." He still preaches every Sunday at the Urbana Christian Church, northwest of Cedar Rapids.

The drawings on page 49 are also taken from the book and are the work of John C. Huseby, staff artist in the publications office at Iowa State College.

HUMUS—THE EASY WAY

(*Continued from page* 75)

planted with a mulch planter, the application of the nitrogen being made at the same time. All the other fertility requirements of these fields have been satisfied by the application of limestone, phosphate, and potash in the amounts indicated by soil tests. By the fourth year enough organic matter has been returned to the soil that only maintenance nitrogen, about 90 to 100 pounds per year, is needed from then on. This 90-pound assist is the minimum for a 100-bushel crop. It represents the amount needed over and above that which will be contributed by the humus and will enable the soil to maintain what Bray calls a positive nitrogen balance.

Bray's theory is not to pour on the ferti-

lizer to get a big crop, but to maintain the humus and nitrogen balance. "The largest corn yields in our ten-acre yield contests," he says, "have been from fields where the largest part of the nitrogen came from organic matter of one type or another and only part of it came from commercial nitrogen." Humus supplies nitrogen to the crop at rates at which it can be used, whereas synthetic nitrogen applied to the soil is available all at once.

He is also convinced that no matter what kind of a cropping program a farmer follows there will be no lack of organic matter for humus formation if the fertility program, with particular emphasis on nitrogen, is adequate. Continuous corn with a cover crop, handled as has been described, will return in the neighborhood of four tons of crop residues per acre to the soil every year. This can make a lot of humus if handled right.

Tillage

Another important consideration in building up organic matter is tillage management. On the Illinois plots, corn planted in the conventional manner was cultivated only twice, while cultivation was limited to once on the mulch-planted corn. The more a soil is opened and worked, the more humus is destroyed. That is why mulch planting finds so much support around the experiment stations and why farmers as well as extension workers are pioneering with wide-row corn intercropped with grasses and legumes. This requires special tillage, cultivation, and seeding machinery, but by eliminating much of the working of the soil, the organic matter is protected from oxidation and allowed to accumulate, and total yields of corn and forages are increased.

So you can increase the active organic matter in your soil: and you can do it without any loss of crop revenue. The basic steps are: Use plenty of fertility; intercrop your corn with legumes and grass or sow a cover crop as early as possible; turn the cover crop under with 200 pounds of nitrogen per acre until the humus-nitrogen balance has been built, then cut back to 90 to 100 pounds of nitrogen; and work the soil as little as possible.

FIRE STOPPERS

(*Continued from page* 55)

together. Adding the chemical breaks up that tendency and so gives the water more soaking power, particularly on materials that don't absorb water readily, such as hay and straw. The result is that the water does its job more effectively, and goes much further.

The chemicals commercially available —there are several makes—are somewhat expensive—$5 a gallon and up. Most formulas call for a gallon of the stuff to 100 gallons of water. The mixture is also

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The Self-Propelled Seaman is truly a rugged, trouble-free, all-purpose tillage tool especially valuable for operations where a high rate of soil preparation day in and day out is a major requirement.

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Self-propelled Seaman Rotary Tiller working-in extremely heavy cover crop in one pass.

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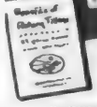

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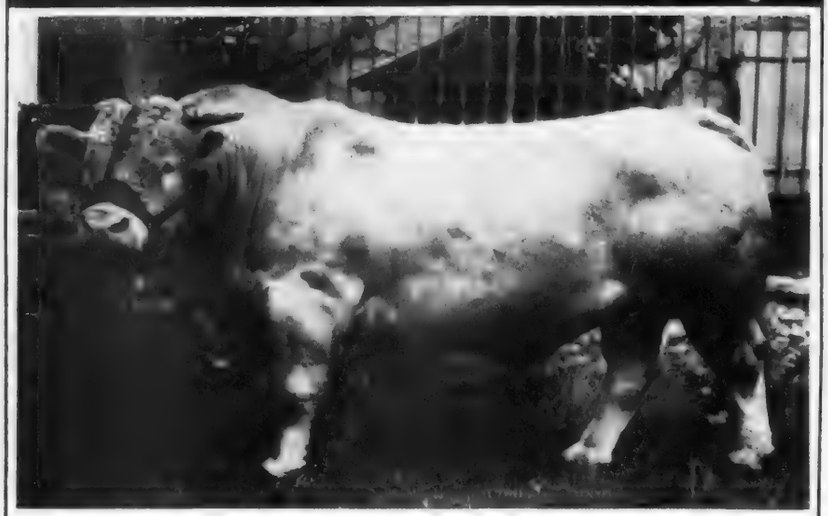

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a little corrosive. Because of that, some makers recommend adding the chemical to the water at the time it is to be used. Some brands have rust inhibitors included and can be kept ready-mixed. Thorough mixing is essential for best results with all of them. The mixture will take a slightly lower temperature than water.

Some professional fire chiefs say that ordinary laundry detergent will work about as well as the commercial product. How much to use will depend largely on what detergent is used. The idea is to mix in as much as the water will take without getting foamy.

An old stand-by is the soda-acid extinguisher. Actually it is a water extinguisher, although it holds a 2½ gallon solution of ordinary baking soda and a four-ounce bottle of sulphuric acid. When the extinguisher is upended, the acid mixes with the soda to form carbon dioxide gas which forces the water out under about 100 pounds pressure. What comes out is perfectly harmless, but there's none to be wasted. A soda-acid extinguisher won't last more than 90 seconds, though it will throw a stream of water thirty feet, put out a lot of fire, and be worth the $16 it costs if used in the right place at the right time.

Recharging is simplicity in itself, and should be done once a year to be on the safe side. Recharge time is a good time to practice using one, by the way. You can either buy packaged recharges or pick up a pound of baking soda at the grocer's for a dime and four ounces of sulphuric acid at the drug store for a quarter. It's a good idea to rinse out the tank before recharging, to blow through the hose to make sure it is clear before refilling, and to blow through the hose again after you've screwed down the top to make sure there's no leak there.

The big disadvantage of pump tanks and soda acid extinguishers is that they must be protected from freezing.

It is possible to mix calcium chloride with the water of a pump tank to cope with the freezing problem, but that's a method to avoid if possible because of a tendency to corrode the tank or pump mechanism. If you must use calcium chloride, be sure to wash out the tank thoroughly and refill with clear water when danger of freezing is past.

And never put calcium chloride in a soda-acid extinguisher. Besides corroding the tank, it will likely prevent it from operating properly when put to use.

Several manufacturers of fire extinguishers put out units using anti-freeze solutions, but they're not widely used. Most of them use a calcium chloride solution which, in spite of all that can be done, tends to be corrosive, and most of them use a pressure cylinder of carbon dioxide to force out the solution. That of course runs the cost up for what is still essentially a water-type extinguisher, and complicates recharging, too.

A new variant on the soda-acid idea is the so-called "loaded stream" extinguisher. Similar in appearance, but costing more both to buy—around $25—and recharge, it uses a different solution and a cylinder of carbon dioxide under pressure to propel the stream.

Similar to the soda-acid, and operated in the same way by up-ending the container, is the foam extinguisher. Here again, protection from freezing is essential, and the warning not to use on live electrical equipment is equally forceful.

Foam's major forte is in handling fires in oils, greases, or paints. The armed services and air lines rely on big installations of foam generators to blanket burning aircraft on the ground or carrier deck. (Big planes have built-in carbon-dioxide fire extinguishing systems).

What happens when a foam extinguisher is upended is that the chemicals inside mix to produce a stream that forms a blanket of small, tenacious bubbles. The bubbles cling to the surfaces they hit, and smother out the fire.

The important thing, of course, is to create plenty of bubbles, so the right way to use a foam extinguisher is to play it so the stream will "break" over the edge of the fire, instead of hitting it solidly. The bubble blanket will smother the fire and stick for quite a while, and then have to be washed away if the surface is anything you care about keeping clean.

Foam extinguisher prices are comparable to those of soda-acid, but the recharges are made especially for the type, and cost a couple of dollars. Full recharging instructions are—as on all extinguishers you reload yourself—given on the container and should be followed closely.

Freezing temperatures don't bother the carbon tetra-chloride extinguisher—the

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BS&B "PERFECTION" Grain Bins are the lowest priced *quality* steel bins on the market today—and they last for years and years! Better order YOURS now, while there is still time to get them up before the harvest! See your "PERFECTION" Dealer, or clip and send the coupon for more information!

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familiar, quart-sized brass tank with a pump handle on one end. Working the pump throws a small, 20-foot stream of carbon tet which does some fire cooling in itself, but works mainly by turning into a gas that smothers out the fire.

The carbon tet extinguisher, costing around $8, is a good general-purpose device. It handles small fires in ordinary combustibles such a wood, paper, and the like. The gas it forms smothers oil and grease fires, and because carbon tet is nonconductive it is safe to use around electrical equipment.

But the fluid is a little corrosive, and it is important to work the pump now and then to make sure the extinguisher isn't gummed up. Carbon tet is a good cleaner, and it's a temptation to swipe a little from the extinguisher hanging in the garage or the shop when need arises. More important is the fact that, since the extinguishing agent is a gas, it won't help much in a stiff breeze out in the open unless the fire itself is in a protected spot, such as under the hood of a car. Most important is the fact that the gas, under heat, breaks down into compounds such as deadly phosgene. So, *never* use carbon tet in a closed space like a closet and then hang around to see if it works. Shoot the stuff in and then slam the door.

It's important to use a carbon tet extinguisher properly, too. Don't just aim in the general direction of the fire and pump away. Get the stream to the base of the fire. Pumping into the heat of the thing only gives heated air currents a chance to sweep the gas away.

Recharging such an extinguisher is simply a matter of pouring in more carbon tet at about a dollar a gallon.

Also on the market are pressure cans of carbon tetrachloride or another extinguishing agent, chlorobromomethane. Some use air and others CO_2 to maintain pressure. Using them involves pressing a valve which breaks open the pressure cylinder, which is perhaps simpler than working a pump but calls for a few more dollars in original cost. They have to be weighed now and then to make sure they are still holding a charge. The quart size is the most common and most useful.

Also relying on a gas to do the work are the carbon dioxide or CO_2 extinguishers, effective against most types of fires, not subject to freezing troubles, not damaging to things on which the gas is used. They need only weighing now and then to make sure none of the gas has leaked away.

But they are expensive, and expensive to recharge, to offset their reliability. One holding a 15 lb. charge of gas weighs nearly 50 lbs., lasts not over two minutes on steady discharge (the right way to use one is to shoot bursts of gas at the

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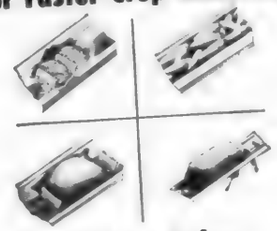

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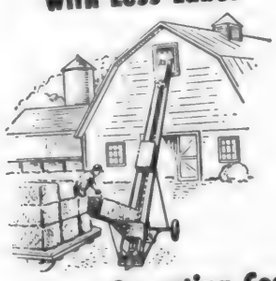

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fire), and costs around $46. Smaller ones, 2½ pounds or so, cost around $18 and are accordingly less effective even though easier for a woman to handle. A 15-lb. recharge costs around $4, and places to do the recharging aren't likely to be found outside the larger cities.

Nervous folk might consider it a disadvantage that effective use of a CO_2 extinguisher calls for getting fairly close-up to the fire. A 15 lb. job should be used at eight feet distance or less, and the smaller ones naturally even closer. One thing to watch is to be sure to hold the funnel that directs the gas only by the rubber handle. The stuff is intensely cold (in fact, flakes of dry ice fly out when the valve is opened) and a hand gripping the metal could freeze to it.

The only way to tell if a CO_2 extinguisher is in shape for its job is to weigh it. Most manufacturers say that if a 15 lb. CO_2 extinguisher is down 1½ lbs. it should be recharged.

A relative newcomer to the fire-extinguishing field is the dry chemical affair.

Fire-fighting circles have known for some time that a handful of dry baking soda thrown vigorously usually will put out a small fire, largely because the heat breaks the soda down into carbon dioxide gas which smothers the flames. (That's an idea you can use, by the way.) The dry chemical extinguisher does about the same thing. The chemical is a treated soda, blown out by CO_2 in a pressure cylinder. Not too effective on ordinary fires that have made any headway, they work well on grease, oil, and electrical fires, and of course aren't subject to freezing.

Some dry chemical extinguishers shoot all they've got when the valve is opened. Most of them can be fired in bursts at the fire and are considered the best to use. A 15 lb. model—that's the weight of the extinguisher, not the chemicals—costs around $37.50. Recharging involves about $3.75 for the chemical and $5 up for the gas cylinder. The cylinder should be weighed once a year to make sure it is still holding its charge of gas. Aside from that, no attention is necessary.

As for the ever-threatening grass fire, a wet burlap sack tied on a broom handle is one of the handiest gadgets yet, and the farm wife should remember that if a pan of grease on the stove flashes into flame, the best thing is to slap a lid on it.

THE AUTHOR: As assistant chief of the Terrace Park, Ohio, Volunteer Fire Department, Ellis Rawnsley has had a full share of experience with fire extinguishers, both big and little. His advice that the fire laddies will be as happy as the homeowners if they find the blaze out on arrival is given, he says, with the utmost sincerity. In his non-fire fighting hours Mr. Rawnsley is editor of the Ohio Valley Edition of the Cincinnati *Times-Star*, and writes frequently for the agricultural press.

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DIESEL POWER

(*Continued from page 63*)

manufacturers of Diesel engines are: Buda Company, Harvey, Illinois; Caterpillar Tractor Company, Peoria, Illinois; J. I. Case Co., Racine, Wisconsin; Continental Engines, Muskegon, Michigan; Detroit Diesel Engine Division, General Motors, Detroit 28, Michigan; Fairbanks Morse, Chicago 5, Illinois; Hercules Motors, Canton, Ohio; Minneapolis-Moline, Minneapolis, Minn.; Oliver Corp., Chicago; Sheppard Diesel, Hanover, Pennsylvania; Witte Engine Works, Kansas City 3, Missouri.

Diesels Don't Wear Halos

These are good things about Diesels, and though the tractor salesman may say only the extra cost remains as a disadvantage, there are some skeletons in the closet, so to speak, that may bother the farmer when he hears that "the Diesel is here."

Ralph Martz, who lives up in the Dutch country near Holland, Michigan, tells the story of a bulldozer operator several years ago who came from Chicago to do some land leveling and forgot his blowtorch. He didn't get the Diesel going until he took time out to find one at a neighbor's and warm the engine up with it. And many early Diesels had openings in which a

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For farm uses too numerous to list! Pumps 400 times its weight of water per hour at average heads. Primes in 75 sec. at 25 ft. suct. lift. Has maximum lift of 30 ft. (Sea level). Weighs only 62 lbs.

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That means less outgo for feed concentrates, more *income* from heavy milk production.

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FUELS FOR FARM TRACTORS*

	Advantages	Disadvantages	In General
GASOLINE	1. Convenient. Easy starting, simple operation. 2. Widely used. Stable prices. 3. Easily serviced engines. 4. Lowest first cost of engine. 5. Good resale of used tractors.	1. Power loss and valve trouble often result from combustion chamber deposits. 2. Fire hazards in storage and handling. 3. Pilferage.	A good fuel for small tractors and diversified jobs. Highest fuel cost for the work accomplished. Used in 80% of all tractors in the U. S. A. Used in 50% of Nebraska's farm tractors.
TRACTOR FUEL	1. Easily serviced engines. 2. Low first cost of engines. 3. Lower fire hazard. 4. Hp. hr. per gallon equal to gasoline.	1. Two-fuel system needed for starting. Troublesome. 2. Cooling water and manifold temperatures must be high. 3. Fuel dilutes oil. 4. Engine deposits. 5. Low power for size of engine.	A good fuel for warm weather and all but light loads. Requires careful operation for best results. Medium fuel cost for the work accomplished. Still widely used in Nebraska, but losing in popularity. Fuel may vary widely in volatility, octane rating, and heat content per gallon.
DISEL FUEL	1. Highest engine efficiency. 2. Best part load economy. 3. Low fire hazard in handling and storage of fuel. 4. Long engine life. 5. Good fuel distribution insured by injection system.	1. First cost of engine is high ($400 to $800 above gasoline). 2. High compression makes a 12-volt electrical system or special starting equipment necessary. 3. Many shops are not well equipped for repair of diesel engines. 4. Injectors may foul with excessive idling.	A good fuel for tractors operating 800 hours and more per year. Lowest fuel cost for work done. This fuel is gaining in popularity, and will be available in smaller tractors. Extra care should be taken to insure cleanliness of fuel.
PROPANE	1. Clean burning. Minimum engine deposits and oil contamination. 2. Long engine life. 3. Good part load economy. 4. Good fuel distribution — fuel vaporizes before entering the manifold. 5. Smooth engine performance aided by high octane rating.	1. High first cost of engine and accessories ($150 to $400 above gasoline). 2. Converted engines often low in efficiency. Carburetors are difficult to adjust. 3. Least work per gallon of fuel. 4. Bulky tanks interfere with visibility. Special (and high-priced) storage tanks are needed. 5. Fire hazards in storage and handling. 6. Hard starting in cold weather.	Propane has become a popular engine fuel in some areas. At Nebraska prices, it is comparable to tractor fuel in terms of work per fuel dollar. Tractors should be used at least 400 to 500 hours per year to show any real saving over gasoline. Price of the fuel may vary greatly from one area to another, and may vary from season to season.

Property of Fuel	Gasoline	Tractor Fuel	Diesel	Propane
Heat content per gallon, in British thermal units (approximate)	124,500	135,000	138,000	91,500
Work per gallon, in drawbar horsepower hours (from Nebraska tests of wheel tractors)	9.6	9.6	13.3	7.7
Compression ratios of farm tractors (average of those tested at Nebraska)	6.2:1	4.75:1	15:1	6.9:1
Approximate range of octane rating (anti-knock quality)	72-80	30-40	—	100

** This analysis of various farm fuels was made by the University of Nebraska, College of Agriculture*

blowtorch flame was meant to be shot to help make starting easier.

Today, hard starting is under control, and at temperatures of freezing and over there is no more problem in getting a Diesel going than any other engine. For colder weather there are various "assists." Some Diesel engines use a small gasoline starting engine. An electric starter gets the gasoline engine going and it spins the big Diesel. Ether, which can be injected into the cylinder for quick starting, is used by some manufacturers. A heating element is built into the engine block on other engines to keep them warm when not in use. This is connected to the 110-volt current. A "glow plug" is another quick-starting assist, which is available on some models in the Caterpillar industrial engine line. The glow plug is a heating element much like that used in an electric stove. The glow plug starts to glow shortly before the starter spins the engine, and the necessary heat is supplied to ignite the fuel that is sprayed in the engine. Other engines start on gasoline and then switch over to Diesel fuel.

The real problem in starting a Diesel in cold weather comes from the fact that the engine must be spun *fast* to develop compression heat and ignite the fuel, before the heat leaks out through the cold metal walls of the cylinder. Of course, the standard method of starting a Diesel is to have heavy-duty 12-volt batteries hooked onto the starter; this is effective unless the batteries are cold, too—then they add to the trouble, for their power is at a low ebb. The higher the compression ratio, the more heat is generated, and the engineers have counted on the high compression—as much as 22 to 1 compression ratio—to make winter starting easier. In buying a Diesel engine it would be well to make sure that at least one of these "assists" are available on the one you pick out. In much of the country, a couple of dozen mornings in the year could be labeled "tough starting weather"; the rest of the year will be no problem.

The other two points on the Diesel engine that need a close look are the injectors and fuel pump. Diesel fuel oil, like gasoline, can pick up dirt in tank cars and trucks and farm storage tanks. But when it reaches the pump on a Diesel engine it *must* be clean. To take care that it is clean, most Diesels have effective filters and trapping devices to take out dirt, water, and all other foreign matter.

The fuel pump may have a separate plunger for pushing the fuel out to each cylinder or it may have a single plunger that rotates and services all the cylinders. As the pump is the "timer" of the Diesel engine, it is driven from gears for accuracy. The parts of the pump must be precision fit and made from highest quality steels. From the pump the fuel goes to the injectors which spray it into the cylinders. Here again an extremely close "fit" must be maintained in order that the right

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Behlen COMBINATION DRYING TOWER and HEAT BLOWER

"Our dryer enabled us to sell 9,000 bu. of new corn at the old price . . . 25c a bu. more than we would have received 2 weeks later . . . Our field losses were cut in half by being able to start 3 weeks earlier."
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Cutaway view

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Made of ¼" diameter steel bars. Mesh corrugated for extra strength. Completely prefabricated. Comes in 4-ft. sections.

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Same heavy bar mesh. Rust resistant. 3 sizes: 1022 bu., 1500 bu., and 1930 bu.

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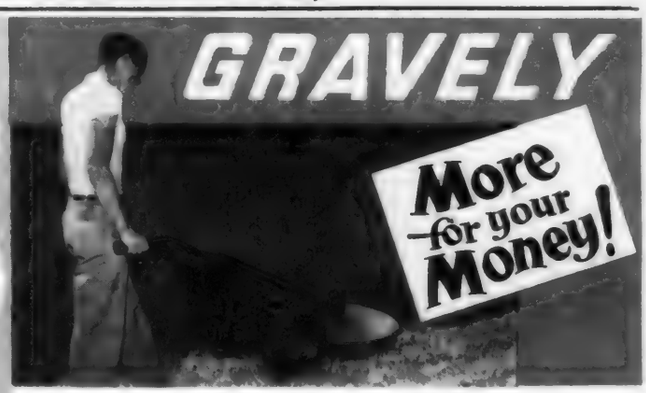
Heavy steel bar mesh tubing helps dry corn no matter how you store it. Millions of feet in use.

BEHLEN MANUFACTURING CO., Dept. FQ, Columbus, Nebr.



5-HP GRAVELY Makes Tough Jobs EASY!

Gravely does jobs other tractors won't . . . because Gravely has that *extra* power for tough mowing, gardening, field and farm jobs.

And you get *more* when you get Gravely: All-gear drive, power reverse, simple, easy operation, power attachments *securely* mounted, quickly interchanged by only four bolts!

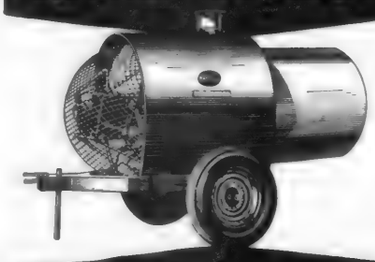
PLUS . . . 21 JOB-RIGHT TOOLS!

Your choice of 21 tools . . . used with one versatile tractor that saves you time, work, worry, *all year long.*

"Power vs. Drudgery" booklet shows how Gravely solves your upkeep and gardening problems. Write for it today!

GRAVELY TRACTORS, INC.
BOX 632 DUNBAR, W. VA.
Please send **"Power vs. Drudgery"** and dealer's name.
NAME_____
ADDRESS_____
CITY_____STATE_____

Hartzell Power Speeds Drying...



Saves You Money

A Hartzell crop drier packs the punch for a fast drying job. The powerful Hartzell unit forces the heated air into the heart of your batch drier, bin or mow. And that's what it takes to insure fast, complete drying. Faster drying saves time, saves fuel. Hartzell power puts money in your pocket.

Compact. Sturdy. Easily portable. Completely automatic. Three sizes — 3, 5 and 7½ h.p. And the Hartzell drier comes as a complete package. No extras to buy. See your dealer or write today for details.

HARTZELL propeller fan co.
Div. of Curtis Wills Corp.
Agricultural Division Dept. F **PIQUA, OHIO**

*Try This
PROFIT MAKER

50 lb. self-feeding boxes

For...
TURKEYS and POULTRY

*Blue Ribbon Condensed Whey contains vital milk vitamins, minerals and nutrients to assure maximum growth, health and finish . . . and maximum profit for you. Keeps birds eating—prevents setbacks—tones up digestive tract—promotes rapid growth—builds resistance to disease. Blue Ribbon Condensed Whey is the miracle additive for more profit in raising turkeys and poultry.

BLUE RIBBON CONDENSED WHEY

Compare this Analysis

Riboflavin 6.50 mg. per lb.	Lactic Acid 12.%
Vitamin C 20. mg. per lb.	Lactose (Milk Sugar) 41.%
Niacin 6. mg. per lb.	Fat 5%
Choline 700. mg. per lb.	Milk Minerals 6.%
Pantothenic Acid 8. mg. per lb.	Milk Protein 8.50%
Vitamin D 2700 IC Units per lb.	Fibre ..... None
	Total Solids .....62.% (including lactic acid)

Ask your dealer for Blue Ribbon

THE MERCHANTS CREAMERY CO.
536 Livingston Street Cincinnati 14, Ohio
Plants throughout the Central West States

amount of fuel is sprayed or squirted into the cylinders. In many engines the valve mechanism of the injector is replaceable as a capsule unit. This guarantees that the valves will fit exactly as they were meant to fit in assembly at the factory.

The amount of maintenance needed in Diesels varies, but because of their heavy-duty construction is usually less than for any other type of engine. Like all power plants, they need the right lubricating oil, maintained at right level. Since Diesels often are called on to run under dusty conditions, the air filter should be serviced daily. Certain makes of Diesels need a constant temperature of 165-190 degrees F. to operate efficiently. The thermostats in the radiator are set to keep the engine at this range. That is about 20 degrees hotter than is wanted for a gasoline engine. It is especially important to keep Diesel raditors free from lime and deposit. And the front of the radiator must be kept free of bugs and leaves, or the engine will develop a fever.

Charles Mathias and his father farm 450 acres that straddle the state line between Maryland and Pennsylvania, near Lineboro, Maryland. Their line-up of tractors consists of five husky 2-bottom models. Three of them are gasoline and two are Diesel; there is an Oliver 77 Diesel and a Sheppard SD-3 Diesel. Mathias says: "I can run the two Diesels for less than the fuel cost of one gasoline tractor, and I have a good way of checking them. The fuel truck comes every two weeks and delivers gasoline and the bill will be right at $60. Then the first of every month he comes and delivers me the Diesel fuel oil; that costs me $35. But because the Diesels have the power, they always seem to get the call for the heavy jobs. They always go out for the plowing and disking; they get more than their fair share of the work. I started with a Sheppard SD-3 in 1949, then traded it in for the new model that had more power in 1951. On the second one the repairs have consisted of a new starter solenoid, which cost four or five dollars. The Oliver hasn't cost us any trouble, just a valve grinding job. Both of them start good in cold weather. With the Oliver you push on the manifold heater button and count to ten before giving it the starter. The Sheppard has a built-in heater in the manifold that goes on when you push the starter button, and it usually kicks in with the heated cylinder after a second or two.

"I like to hook a Diesel up to the belt for the hammermill," says Mathias, "because I can run through 100 bushels in an hour if the corn is dry. You can feed it in just as fast as you can shovel and it doesn't slow down. We are milking 23 cows and we grow all of our own grain and hay. We used to raise 20 acres of tomatoes, for our own canning plant here on the farm, but we can't get the labor any more; ten acres is plenty for us now."

Down in the rice fields of near Bay City,

CORRIEDALE SHEEP

Corriedale sheep shear more dollars worth of wool per head than any other breed while producing mutton of high quality.

Attend the Second Annual Eastern District Corriedale Show and Sale at Harrisburg, Pa. August 6 & 7, 1954 and also The National Corriedale Show at Columbus, Ohio, September 1 and 2, 1954

For descriptive literature write:

AMERICAN CORRIEDALE ASSOCIATION, INC.
ROLLO E. SINGLETON, *Secretary*
108 Parkhill Columbia, Missouri

CORRIEDALE SHEEP STOCK FOR SALE

From our own imported rams plus International and Denver Stock Show Champion.

LEABHART & ANDERSON
Breeders & Importers
Tipton Iowa

Be sure your business is a pleasure

RAISE CORRIEDALE SHEEP

Send for catalogue of our sale On July 7, 1954

WOODBINE FARMS
H. H. Walker & Sons
GAMBIER, OHIO

DRIVE POSTS

with PUSH-BUTTON EASE

Hammer down your fencing cost! Fence faster and easier save time and labor with the revolutionary Danuser Post Driver. Tractor-mounted, power driven, one-man operation. Single lever controls broad-faced 200 lb. driving weight. Delivers 25 blows per minute. Quickly drives steel or small wood posts. No splitting or "mushrooming" tops. Pivot adjustment for leveling on uneven ground. Tested and approved by tractor manufacturers. Also available as a trailer unit.

Write for literature pertaining to your model tractor, or specifications on TRAILER-MOUNTED DRIVER.

Manufactured by

DANUSER MACHINE CO.
505-09 East 3rd Street • Fulton, Missouri
"Contributing to Farm Mechanization"

Texas, B. J. Jones held on to his 1929 Case "L" until the big Case Diesel "500" came along in 1953. This was the first tractor that had tempted him, for he wanted power and a sure-footed tractor for the heavy pull he met in soft and oftentimes flooded fields. The 500's six-cylinder Diesel engine, he says, is the answer to the heavy pull and big acreage he has to farm and live with; and the power steering makes it easy to work in the heavy ground.

Diesel engines are well suited for use in crawler tractors and they are available in every make. In the large wheel tractors Diesels are usually available as optional engine equipment. In the smaller wheel tractors newly announced Diesels have been the big news of the year.

The wheel-type Diesel tractors are made by these companies: J. I. Case Company, Racine, Wisconsin; Cockschutt Farm Equipment, Belleville, Ohio; Ford Motor Company, Birmingham, Michigan (Fordson Major, imported from England); John Deere, Moline, Illinois; International Harvester Company, Chicago 80, Illinois; Massey-Harris, Racine, Wisconsin; Minneapolis-Moline, Minneapolis, Minn.; Oliver Corporation, Chicago 6, Illinois; Sheppard Diesel, Hanover, Pennsylvania.

JUG MILK

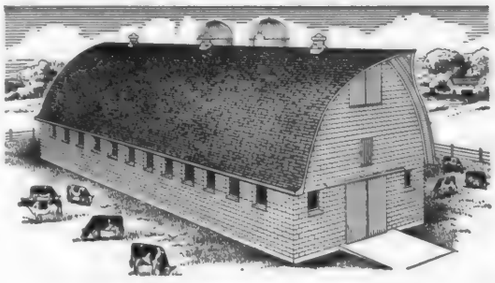
(*Continued from page* 71)

milk to us. We pick it up on 22 routes that cover seven counties in this area."

Lawson's progress against his competition, which consists of several national dairy chains operating in the Northern Ohio area, along with smaller dairies, has been anything but smooth. Soon after his jug stores started to open farmers were warned that "Lawson can't sell milk that cheap—he'll go broke—then where will you be?" That forced Lawson to haul milk from as far away as Indiana. Trucks were dumped over; the Lawson Union drivers struck, but most of the Lawson employes remained on the job. Then the public was told to stay away from Lawson stores because of their anti-labor policies. Next there was a mailbox stuffing campaign which warned housewives of the "impure" Lawson milk. Akron's Board of Health scotched this one with a continuing "OK." So it went, with grease-smeared workmen, housewives with baby buggies, and clubwomen with bridge scores in their purses, all carrying out their jugs of milk from the Lawson stores. Lawson has been called a "price cutter" by his competition as if low prices were something to be shunned. But Lawson continues to advertise his low price as a reason for being in business, and bills himself as "the workingman's friend."

Lawson is selling in the Cleveland area under a Federal order from his new plant in Stow, Ohio. But Jim Lawson's ideas on Federal Milk Orders are now well known to everyone in Akron and Cleve-

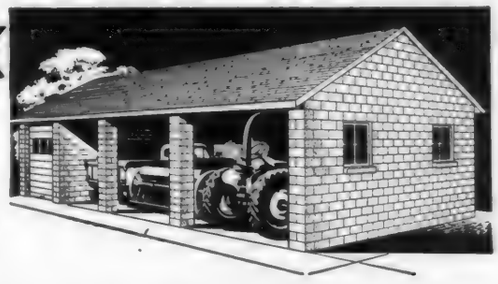
PROTECT *Your Investment* WITH...



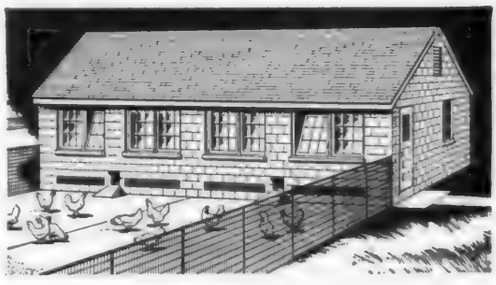
A CONCRETE DAIRY BARN

Don't risk losing your herd, barn or equipment by fire. Insurance helps but can't pay for years of selective breeding or loss of production. A concrete barn can't burn! It defies rats, rot and termites too. And a concrete floor confines a hay fire, gives you time to lead out your herd to safety.

A CONCRETE MACHINE SHED



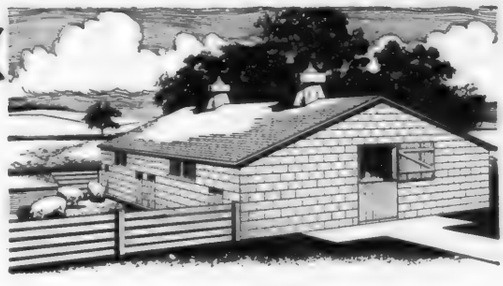
It's good business to protect costly machinery from the ravages of rain, wind, rust, sun and fire. A concrete machine shed also can include an all-weather repair shop. Timely repairs and year-around shelter extend the life of equipment and lessen chances of breakdowns during busy seasons.



A CONCRETE POULTRY HOUSE

Rats, weasels and other vermin that prey on valuable layers cannot penetrate concrete masonry. Concrete is easy to clean and disinfect too because it has no crevices to harbor lice, mites or other parasites. And a concrete poultry house keeps flocks comfortable in winter and summer.

A CONCRETE HOG HOUSE



Fire or disease can wipe out a hog farmer's investment. Guard against this with a concrete hog house. It's dry, sanitary, firesafe, rotproof and termite-proof. Like all concrete construction it's moderate in first cost, needs little maintenance, serves a lifetime. The result: ***low annual cost.***

FREE BOOKLETS. Helpful, illustrated booklets on such subjects as those listed at the right are available free. Just fill in and mail the coupon below. Booklets are distributed only in the United States and Canada. If you need help in making improvements on your farm see your local ready-mixed concrete producer, your building material dealer or concrete contractor.

Dairy Barns • Hog Houses • Remodeling
Machine Sheds • Firesafe Farm Houses
Poultry Houses • Making Concrete
Building with Concrete Masonry
Septic Tanks • Irrigation • Ratproofing

PASTE COUPON ON BACK OF POSTCARD AND MAIL TODAY

PORTLAND CEMENT ASSOCIATION
Dept. 6-86, 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

Please send me free literature, which is distributed only in the U.S. and Canada, on the following (list subject):

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*Name*_____

*Street or R. No.*_____

*Post Office*_____ *State*_____

land, and recently to Senators and Congressmen in Washington, who since the first of this year have been opening their Washington *Star* to see a full page drawing of a milk jug filled with Lawson facts looking at them (see page 69). These advertisements are aimed at keeping a Federal Milk Order out of Akron, though the chances are, that like other problems, this one will be solved and Lawson will still be selling more milk at a cheaper price if the order goes through.

This is the Lawson side of the story. What about the farmers who send their milk to him? How do they feel about his way of buying and selling milk?

Here's how Howard D. Call's son, Charles, taking time out from making maple sugar put it, "Dad and I are both on record as saying we believe Lawson's methods of advertising and handling milk, so that there is a smaller difference between what the farmer gets for his milk and the consumer has to pay, are good. From what I can see, while it may be more convenient to have milk home delivered, there is really no great handicap in picking it up in gallons at the corner store. Twenty years ago things were different. Refrigerators in which you could keep milk weren't common; and people were used to having the groceries and ice delivered. Today everyone has a car and is usually in it at least once a day. We have refrigerators and supermarkets. Buying milk in the jug the way Lawson sells it is just keeping up with the times."

Charles Call added, "Eventually Lawson's method of selling milk will probably mean we will get considerably more for our milk, though right now we get the highest price in the Akron-Cleveland milkshed. Frankly, I think the farmer is not doing his part when it comes to advertising and getting people to drink more milk. Now, some will disagree, I know. But the dairy farmer ought to spend more to sell more people on the idea of drinking more milk. We pay 25 cents a hundred to get our milk hauled to the dairy. We ought to be willing to spend an equal amount for advertising. Then we would really move surpluses and make this business healthy for all. Why you can't spend a night watching television without seeing beer and soft drinks advertised. But seldom do you see anything about milk. We've got a long way to go to be competitive. Frankly, Lawson comes the closest to being competitive I've seen. Dad and I think he is on the right track."

Charles' father, Howard, represents the fourth generation to farm these green acres and he is known throughout the area as a "farmer's farmer." Howard Call is currently Chairman of the Summit County Soil Conservation District and very active in civic affairs. His dairy herd of over 20 Holstein cows averaged over 14,000 pounds of milk per cow last year, showing that they do well on his improved pastures.

Get more water per dollar!

Get the new Rapidayton "CHAMPION" Convertible

You get plenty of water and plenty of pressure with this complete jet water system. You can use it on deep *or* shallow wells because it's *truly convertible!* You get "Quad-Volute" design—a new flange that saves you time and money in plastic pipe installations—many quality features. And you get lowest prices! See your Rapidayton dealer soon and see ⅓ and ½ horsepower "Champion" models with 13 or 30-gallon tanks.

Rapidayton

The Dayton Pump & Mfg. Company
Dayton 1, Ohio

that's why LANTZ
Reg. U.S. Pat. Off.
is your best Coulter buy
*(See official tests below)

Over a hundred thousand farmers have used and praised the original Lantz Kutter-Kolter during the past 15 years. Only Lantz makes 2-bladed coulters. Two blades produce a *double slicing action*... enable a moldboard plow to *cut through* trash, roots and stubble and aid in covering. You'll save time, work and gas by avoiding frequent stops to clear a clogged plow.

NEW MODEL "B" LANTZ COULTER

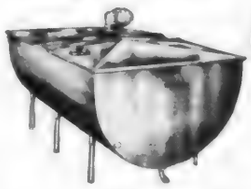
New engineering developments based on 15 years experience as coulter specialists, give the Model "B" (shown below) greater adaptability to plows with limited clearance, also to certain *left-hand or 2-way plows.* Model "B" 16" size recommended for Ford-Dearborn and Ferguson Plows. Disc blade crosses path of coulter blade to give rotary scissor action without binding. (See arrows in illustration below.)

*Dynamometer tests (recorded lbs. pull) prove that Lantz 2-Bladed Coulters pull no harder than other special coulters. They save costly friction and wear on landside of moldboard because they produce less side draft than other special coulters. The Kutter-Kolter can be used as a single-blade coulter where trash is no problem.

Write for free folders: Lantz Kutter-Kolter; Model "B" Coulter; Lantz Swinging Sickle Grinder.

LANTZ MANUFACTURING CO., Dept. CF-537, Valparaiso, Indiana

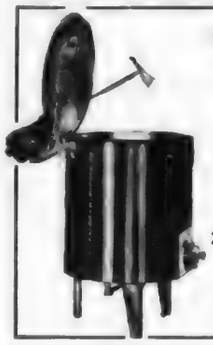
Coldest Bulk Milk Under The Sun!



During last summer's scorching hot weather, Mojonnier Bulk Coolers delivered sharp, fast cooling to 36°F.-38 °F. in hundreds of milkhouses the country over. This safe, low temperature cooling was done soon after the end of the milking period, with a fraction of the power used by other methods. When you switch to bulk, choose the Mojonnier Bulk Cooler, field-proven by impartial tests. Bulletin 290 sent free on request.

MOJONNIER BROS. CO., Dept. FQ, Chicago 44, Ill.

MOJONNIER BULK MILK SYSTEM



It's NEW
Announcing An
ELECTRICALLY AND STEAM HEATED
SPRAY PASTEURIZER
25 to 200 Gal. Cap. by
VULCAN HART MFG. CO.
2006 No. Western Pkwy.
Louisville 3, Ky.

HK
SELF DUMPING TRI-TRALOR
No hoist, hydraulic, or P.T.O. system to bother with.

Easiest maneuvering—mounts any farm box.
EFFORTLESS DUMPING IN 1/10th THE TIME ANYPLACE
HOTCHKISS STEEL PRODUCTS CO.
Dept. 23-N, Bradford, Ill.

Monroe FOLDING BANQUET TABLES

If you are on the board of your school or church, or on the house or purchasing committee of your club or lodge, you will be interested in this modern Folding Pedestal Banquet Table. Write for catalog and special discounts.

THE MONROE COMPANY 11 CHURCH ST. COLFAX IOWA

WITH
SOFT WATER
One cake of soap does the work of 4 or more!
SEND FOR THIS BOOKLET
Oshkosh Filter & Softener Co.
Oshkosh, Wisconsin

How the Lawson Plan Works

Lawson gives this advice to dairymen who would like to sell milk in bulk: "People are in their cars every day and they think nothing of driving a few miles out of their way to save some money on milk. When a family has a convenient gallon jug of milk in the refrigerator, everyone drinks more and the children get all they want to drink, and as much as they need. We like to locate our stores in thickly populated areas on a road leading in and out of town. We also provide plenty of parking space. We handle a small line of groceries, mostly to accommodate customers in the evening and on holidays. Store hours are from 8 a. m. until 10 p. m., seven days a week. On Thanksgiving, stores are closed from 1:00 in the afternoon until 5:00. On Christmas they close at 1:00 p. m. for the rest of the day.

"Operators are paid 8 per cent of sales. Some stores, at that rate, pay as much as a thousand to twelve hundred dollars a month and out of this the store manager pays his own help. It has been our policy to employ operators with families large enough to operate the store themselves, and we have been very successful with such operators.

"The store is equipped and stocked with products charged to the operator at their selling prices. We have never gone in for elaborately furnished stores. As a rule we put in an 8x8 foot walk-in cooler, where the milk is kept good and cold until it is sold. Our stores will average selling about 300 gallons a day; some sell as much as 500 gallons a day."

Lawson has this to say about his plant operation, "Our system of merchandising milk is the result of careful planning, working, watching to keep waste down on materials, handling and equipment. In our own plant we have developed four different food departments, all of them operating on a mass production plan. First, we developed the milk department and put it on a good paying basis. Then we developed the ice cream department. A few years later we developed a bakery department; here we use a good deal of milk, too. In the last three years we have developed our candy department and put it on a mass production basis; we have a peanut cluster machine with which two people can turn out two tons of candy a day. This is our most popular candy; we sell it for 59 cents a pound. These four departments take care of 75 to 80 per cent of our total store sales. That makes it easy for us to control prices on our volume items and at all times hold a tight rein on our business."

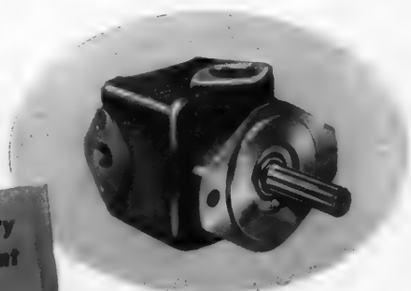
Lawson makes no secret of the productive ability of the men who work for him. He says, "The processing of our milk will average 800 to 1000 gallons, per man, per day. Ninety per cent of it goes into gallon jugs, the rest into half-gallons and some quarts. We have been changing pint and quart customers to gallons

"Caterpillar" No. 41 Hydraulic Control imparts increased versatility to "Caterpillar" D2 and D4 Diesel Tractors. Here a D4 Tractor and tool bar with ditcher attachment is making irrigation ditches.

"CATERPILLAR" uses VICKERS HYDRAULIC PUMPS

"Caterpillar" selected the Vickers Pump (shown below) for the source of power in the No. 41 Hydraulic Control because of its outstanding performance . . . performance that results from several exclusive features. This Vickers Pump is vane type, hydraulically balanced and has automatic wear compensation. This means that it delivers more oil while taking less power from the engine . . . that it has a much longer life with minimum maintenance . . . and that it insures dependability and easier cold weather starting of the tractor. A Vickers Pump is the mark of high quality in hydraulic power controls.

This is the Vickers Pump used in the "Caterpillar" No. 41 Hydraulic Control. Hydraulic systems on tractors and other farm equipment use more Vickers Pumps than any other make.



People who look for quality in tractors and farm equipment also look for VICKERS.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

New Way to Dry Crops on the Farm

By Ben L. Tomlinson

HERE'S A WAY to put your tractor to another use . . . by using tractor power take-off to dry all small grains, shelled corn, beans and hay. Dry right out in the field with your combine or picker, if you wish.

No assembly, building, bin or ductwork is needed. Completely portable, the Cropgard Dryer is delivered *ready-to-run*. Simple to operate. Powerful fan blows a large volume of heated air from twin oil burners up through perforated steel floor which supports 170 bu. grain. Excellent for custom drying. In one hour you can dry 100-125 bu. shelled corn or beans; 150-175 bu. small grain; 1 ton hay. Costs less than 2c bu. to operate. The quality of drying is tops. Temperature controls are convenient and automatic.

Patent Pending

Cropgard sells for $1985, F.O.B. factory. Running gear and built-in hydraulic hoist (for simple unloading) are extra. Quick delivery. *Write for free, illustrated literature and bona fide copies of letters from customers.*

CROPGARD
FARM DRYER
LAKESHORE MFG. CO.
3307 Republic Ave., Minneapolis 16, Minn.

2-WAY
LIGHTNING
PROTECTION

FOR FARM BUILDINGS

Lightning never has destroyed any building fully protected by Security System. Protects against new dangers from metal piping, air ducts, etc. Low points, almost invisible. Most durable materials used, all UL approved.

Green Guard Capacitor holds lightning surges to less than line voltage. Prevents damage to water heaters, ranges, lamps, motors. Approved by Underwriters Laboratories, Inc. Nothing to arc or burn. Guaranteed five years.

FOR ELECTRICAL APPLIANCES

Send for full story of 2-way protection.
Security Mfg. & Contracting Co., Burlington 5, Wis.

SECURITY
Lightning Protection in the Modern Manner

by the thousands for the last 15 years.

"We have worked out a smooth-running, economical system of delivery that is done without hurry and in a short day. Our drivers average setting off 1500 gallons per day, per man, per truck, so you see they have no time to lose; but at that they do not average eight hours per day."

For those who are still trying to find the hidden Lawson "secret weapon" Jim Lawson has prepared a mimeographed bulletin called "The Step by Step Lawson Plan." This tells how the stores are set up, who makes gallon jugs, how to merchandise the 150 items that bring people into the store, from corn plasters to "Milkmade Bread" and 14 flavors of "Lawson's Ice Cream." He ends with the modest statement, "This is just a simple outline of our plan as we developed it. Should you try it, and run into difficulties that you need help on, let us know and we will be glad to help you if we can."

THE AUTHOR: A graduate of Wooster College and a former reporter on the Paris Edition of the *Stars and Stripes*, Robert Taylor is now a free lance writer originating items from the Cleveland, Ohio, area.

THEY STARTED FROM SCRATCH

(*Continued from page* 38)

which he sold to buy a second-hand lug tractor and a cultivator, the only tools he had. He had enough money for a down payment on a baler, corn picker and combine, and started custom work. "The cash began to roll in." He found he still had some excess energy and daylight hours, so he planned to share-rent outside acreage. When his landlord wanted a share of this, Kane said to heck with that, sold all his livestock, and put a down payment on a place of his own.

The place has 150 acres of rolling land, run down when he bought it for $50 an acre. He got to work on building up the soil, rebuilt the house and barn, paid off the mortgage, and today could get $300 an acre for it. Last year his corn made 80 bushels.

Beryl Kane of Iowa

Free Booklets on Farm Building

Send for free booklets: *"Planning a Farm Home"* outlines a new, practical method of planning. . . . Fully illustrated. *"How to Build Farm Buildings That Last Longer."* Full of valuable tips and suggestions. Pocket size. Illustrated. *Write to:*

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H. E. Stalcup, Secy.-Treas.
American Society of Farm Managers and Rural Appraisers
Box 67, Storm Lake, Iowa

Three years ago he bought an additional 220 acres at $70 an acre, and is building up this place. He owes a little on a mortgage on this farm.

He hired his first help five years ago, but continues with his custom baling, combining, and corn picking. Here is his inventory in brief: 15 Holsteins, plus young stock, $2,500; 20 beef brood cows, $2,500; 60 brood sows, $7,300; fall pigs, $9,250; sheep, $600; 20 head beef calves on feed, $2,200; machinery, $16,000; real estate in clear, $67,000; total, $107,350.

His wife does the paper work in addition to working in the fields. They have two children, both girls, 7 and 12. The twelve-year-old regularly drives a tractor and knows more about each one of the 60 sows in the farrowing pens than most farmers know about their family milk cow. College for both the girls is in the Kanes' plans.

There is no secret about the success of the Kanes—hard work and good management. Kane picked a wife as able and solid as himself. A team like that can laugh at experts who say the little man no longer has a chance in America.

Bill Willich of Kansas

A Flint Hills farmer, with his right arm gone and a finger missing on his left hand, wanted to own his own farm. He didn't think this too much of a handicap.

In 1947, Bill Willich put down $1,200, his life savings, on a badly gullied and over-cropped 80-acre upland farm on the eastern slope of the Flint Hills area in Elk County, Kansas—and set out to build up a stock farm.

About this time he lost his right arm in a hay baler accident. This accident, and a boyhood accident in which he lost a finger from his left hand in a brush with a dynamite cap, would have been enough for lesser men than Bill Willich.

With the help of his wife, Ruby, and two children, he set out to improve what he had already started, so that he could make a farm produce that many said wouldn't grow a healthy cockleburr.

Ever since Bill was a youngster on a farm in Brown County, Kansas, he had dreamed of the time he could own his own place and raise a family. He attended Hickory Grove School near his northeast Kansas home and St. John's Academy in Winfield during the 30's when money was not so plentiful. Upon graduation from high school, he took a job with the United Publishing Company in Kansas City, then went back to work on a farm as a day laborer for 50 cents an hour.

After his marriage in 1935, he started to work for the Santa Fe railroad, advancing to the position of section foreman before resigning to buy his Flint Hills farm in 1947.

Now 44 years old and about 65 per cent handicapped, Willich farms 80 acres and leases 160 acres. In addition, his son, Arlan, a 4-H'r and vo-ag student, rents another 40 acres from a neighbor.

In producing all his own feed Bill has to buy only his protein and mineral supplement. By selling cream and feeding skim milk to the feeder pigs, this program grosses him about $3,000 annually. His cream check averages a little over $100 a month.

Being a Community 4-H Club leader, president of the county artificial breeding association, and a Farm Bureau member, Bill

SALVATORE G. SAUTERNE, noted wine presser, says: "When a man's on his feet all day, like me, he really appreciates fine shoe features. That's why I trot home at night and put on a pair of comfort-guaranteed Allen-Edmonds!"

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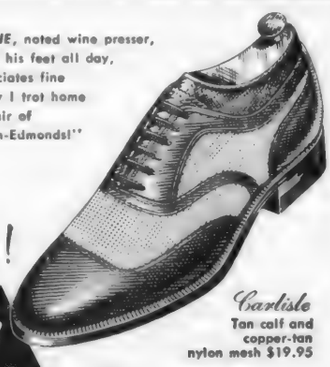

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FAST SILO-FILLING—You really save time at the blower when you handle forage with the "Power-Box" Feeder. Spot the discharge elevator over the hopper and the self-unloading "Power-Box" will keep the blower fed steadily at full capacity. The 2-beater Feeder with optional discharge elevator is shown at the left.

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THE EARLY & DANIEL CO.
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THE FEEDERS SILENT PARTNER

TUXEDO DOG FEEDS

Our 73rd Year

Bill Willich of Kansas

still finds time to be an ardent sports fan and go fishing with his two 4-H children, Arlan, 16, and Joetta, 14.

Thomas S. Lee of South Carolina

Thomas S. Lee has farming in his blood—as far back as anybody knows the Lees have been farmers. He took this love of the good earth through high school and into the United States Air Force late in 1942. Three years later when he came out of the army, he went back to work on his father's farm. During the off seasons he went to work with the R.E.A., saving every dime against the day when he could go into farming for himself. He took several courses in a G.I. farm school.

Tom Lee of South Carolina

Late in 1947 he decided that he was ready to go on his own. He added a $16,000 F.H.A. loan to his savings and bought a 130-acre farm near Alcolu. He had a pair of mules, one cow, and an old pick-up truck, all of which he owned outright. He bought three mules and some second-hand equipment on credit and went to the local bank for the money to see him through his first year.

His antiquated tools and power multiplied the hours he spent in the fields.

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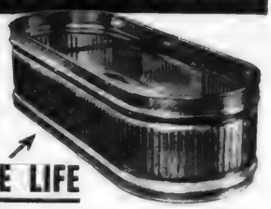

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Accurate, Durable and Complete for Terracing, Ditching, Irrigating, Tile Draining, Grading, Running Lines, Turning Angles and etc.

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That year he had 8 acres of tobacco, 55 acres of cotton, and 65 acres of grain. He had bumper crops and he made a double payment on his loan, bought a tractor, a car, and a new truck.

By 1953 he was rolling along. He bought two additional tractors and went halves with his brother on a mechanical cotton picker. He sells approximately 200 fat hogs each year and from an original two cows, he has built up a beef herd of 35. In addition to the 130 acres of his home farm, he rents land, and this year will have 130 acres of cotton, 10 acres of tobacco, 150 acres of hay and grain, and 60 acres of pasture.

At the present rate he will pay off his loan in half the time, in addition to making extensive improvements on his six-room home and the four tenant houses on the farm. He is secretary of the Clarendon County Farm Bureau and a member of the American Legion. He has a wife and three children.

Justin Dove of Virginia

Justin Dove, of Broadway, Virginia, parlayed a rented brooder house into a fortune. In 1938 he was 17, and just married. He told his bride, "You're marrying a poor boy. All I got in this world is a

Justin Dove of Virginia

Model A Ford." That year he borrowed $5.20 to buy two hogs for the family meat.

The next year he rented a brooder house near his mountain home at Bergton, and got credit at a feed mill for 3,500 chickens; he made $600 on his first brood. In 1940 he took several hundred dollars of his profits and made a down payment on a piece of land. He built a broiler house with a capacity of 6,000, and this, with his rented building, gave him a capacity of 9,600 per run, or a little over 30,000 per year.

By 1942 he had built two more broiler houses, both paid for in cash, and the next year he paid cash for 108 acres near Broadway, and moved there. In addition to the $15,750 he paid for the farm, he stocked it with 40 Hereford heifers and built another broiler house, put up a new barn,

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That's good thinking on your part! Chances are an irrigation system will pay off for you as it has thousands of others. And if you don't have a water system now, let us show you how one pays for itself—usually in 6 months. Or perhaps you want a larger water system—with plenty of water—plenty of pressure for your expanded operations. In either case, you are looking for helpful information that will guide you to the wisest choice in the selection of a pump for your irrigation system—a water system for your home and farm. *Then by all means, see what Barnes has to offer!* Mail the coupon below checking your interest. Signed, tucked into an envelope, and mailed today—it may save you hundreds of dollars.

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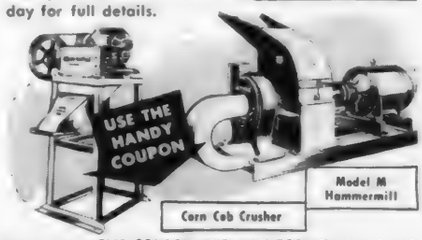

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Here's the answer to your Hog watering problem! Easy to clean, fill and move, ROLL-A-VAC is sturdily constructed . . . has no floats, valves or gaskets to go wrong. Watering is *automatic*—roll up for filling from hose, bucket or pump . . . then down to drink. Weighs only 125 pounds. Drum holds 85 gallons for watering 100 hogs!

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Designed for starting pigs on solid food. Self-contained . . . no separate pens needed to keep sows away. Capacity over 7 bushels. Accommodates 32 pigs. Here's the quick, easy way to feed pigs!

● Automatic ● Farm-tested ● Keeps feed dry
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Write today for complete, free information!

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and began to improve the soil. At war's end, he defied the prophets who said the broiler business would end too, and added 5,000 to his run.

He was having trouble getting chicks when he wanted them, so he built a 65,000-egg hatchery, which he enlarged, in 1951, to 195,000 eggs. In the meantime he had bought a second and third farm, and added a fourth in 1951.

He now owns four farms totaling 438 acres; broiler houses with a capacity of 100,000 birds per year; laying houses with a total capacity of 9,000; a hatchery capacity of 2,000,000 eggs per year; 185 head of good beef cattle; 30 head of sheep. He doesn't owe a cent. In fact, the bank owes him—he owns 60 shares of stock.

Arnold Olson of Washington

Early in 1936, Arnold Olson was working as a hand on a Whatcom County, Washington, farm. He had his sights on a farm of his own. The next year he and his father rented a farm. By 1944 he had accumulated a wife, ten Jersey cows, $500 in cash, some household furniture, and a

The Olsons of Washington

tool or two. He cast about for a farm to rent found a 53-acre dairy layout he liked, and went to his banker, who was sympathetic. He loaned him $4,100 to purchase 12 additional cows and some old machinery. Mrs. Olson pitched in, did most of the work with 3,000 pullets each year, kept 1,000 laying hens, sold the remainder to neighbors. By the end of the second year on the rented farm the loan had been repaid and the Olsons were looking around for a buy.

In 1950 they found what they wanted, a 50-acre farm which could be bought for

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The LEGUME-AID package is appreciably larger than others in size and contains more of the bacteria-carrying humus. This extra amount of inoculant makes it easier to treat your seeds more thoroughly at planting time.

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. . . for surer pregnancies . . . for better young

Follow the lead of successful breeders in all parts of the country—feed Breeder-ADE Oil before mating. This blend of carrot oil, wheat germ oil and "D" activated animal sterol successfully combats nutritional sterility. 4 oz. only $1.80 postpaid

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"SWINGING" SICKLE GRINDER

The Lantz "Swinging" Sickle Grinder pays for itself because it grinds *faster, better, easier.* Your sickles will cut better—stay sharper longer—because they'll always have a perfect bevel edge. You'll do such a good job your neighbors will bring their sickles, too—adding to your income!

Revolutionary idea! You swing the arm back and forth—grind coming and going. No more struggling to press sickle against stone; 1 to 7 ft. bars clamped firmly for uniform grinding. AC motor for shop model: ¾ h.p. gas motor for portable job to mount on truck for grinding in field. Used by park and highway crews. *It must be good!*

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$18,000. They put in some of their savings, plus a borrowed $3,000, as a down payment. The balance is to be amortized over 20 years. In addition, they spent $5,000 of their savings on new developments—loafing shed and milking parlor, an irrigation well, and a refrigerated holding tank for milk. They bought 15 cows to bring their herd up to 40 grade and registered Jerseys. They have two big new silos and most of their machinery is new.

His gross last year was $17,284. His assets will top $40,000.

Harold Kenney of Maine

An Aroostock County potato farmer who made a profit in 1953, the leanest year in the history of the county, deserves a bronze plaque on the court house. This rare feat was accomplished by Harold F. Kenney, who started out a few years ago with a bag or two of seed potatoes and now owns his own farm.

Starting out as a hired hand, Kenney, in 1941, bought 30 acres of potato land

Harold Kenney of Maine

with his brother. All he had in the venture was a few bags of seed. In 1943 he bought a 100 acre farm, and now owns 365 acres, 70 in crop land. In 1951 he, with his brother, built a 90,000 bushel storage building while improving his land and building a new home. His gross last year was $41,200. He has four children.

THE ADOLESCENT PIG

(*Continued from page* 57)

that the younger pigs did fine.

Harry Torbert of Farmer City, Illinois, had 20 litters of 5-week old pigs that were not doing well on the sows. Some of them developed intestinal inflammation, but within 3 days after he took the sows away, they all appeared to be normal. Torbert's experience is being repeated in the hog belt. If pigs aren't doing too well on their mothers any time after they are 4 or 5 weeks old, they will probably do better on a highly fortified starter and all the water they can drink.

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Tens of thousands of users find ROTO-HOE ideal for year 'round jobs. A big machine at modest cost, thoroughly engineered and field proven for over 7 years! It will pay you to investigate.

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20" ROTO-CUTTER, only $34.50
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Don't cull good cows, lose identity of purebred calves, make errors in breeding and ownership. Use these big numbered brass tags with strong 40" steel chains. Specify numbers wanted. Order ZC998, 10 for $12.95 ppd.

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You don't have to be a cowboy to find 100 uses for a good lariat like this. Heavy duty, good quality pure manila 30-ft. rope. Standard honda. Order ZC375, ppd. $3.98

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Average, SHORTHORN steer calves $27.00 per cwt.
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$ 4.00 per cwt. MORE!

Average Weight, SHORTHORN steer calves 432½ pounds
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ADD EXTRA POUNDS...
AND EXTRA PROFITS

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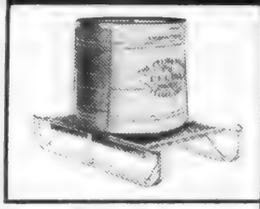

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Experiment station results as well as experiences of practical hogmen prove that early weaning is often desirable. Most swine producers who are close observers will tell you that it is hard to raise good pigs on grain pig starters if the sow dies or dries up before the pigs are three or four weeks old. In cases like this, the pigs have to have milk replacers which contain some milk protein.

Mother Nature apparently intends for pigs to rely largely on dry feed after they are four weeks old, for then the average sow's milk production drops rapidly.

Even on a good complete feed, a large percentage of the pigs may go bad when they are under severe stress. Small weanling pigs cannot stand severe cold, heat, drafts, parasites, crowding, excess humidity, too little water or feeder space.

In the late summer and early fall of the year, pigs may go bad if they do not have enough shade or water.

Roundworms make runts out of a lot of weanling pigs. Worms seem to get ahead of the pigs when they get a setback from other causes. Most good hogmen like to worm their pigs a week or two after weaning, using sodium fluoride or a comparable wormer. They also make it a practice to spray the pigs with Benzine Hexachloride or Lindane soon after weaning to kill lice and mange.

One should allow at least 5 square feet of sleeping space per pig. It is bad when they pile up in big bunches because they're crowded. Pigs become uncomfortable if the humidity in the barn becomes high, as it often does in cold weather. Small pigs tend to fall further behind when they are running with larger ones.

One must provide at least one self feeder lid or space for each four pigs. It is also important to have the feed and water in the same location. Pigs have to have all the water they can drink on modern high energy diets. One of the big secrets of the efficiency of modern rations is an increased amount of water that the pigs drink. One should provide one drinking cup for 20 pigs. A waterer with two openings is considered two cups.

THE AUTHOR: W. N. McMillen has been active in the swine industry for 20 years. He is director of Feed Nutrition and Research for the A. E. Staley Manufacturing Company, Decatur, Illinois. Prior to making his connection with the feed industry in 1950 he had been Professor of Animal Husbandry at Panhandle A. & M. College in Oklahoma and Associate Professor of Animal Husbandry at Michigan State College, in charge of swine research and teaching. He is the senior author of the book, *Hog Profits for Farmers.*

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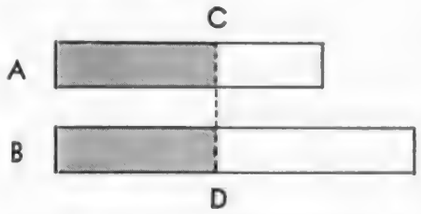
BLUEGRASS

(*Continued from page* 67)

forage crop, you want to weigh the efficiency factor versus carrying capacity. Up to now, pasture recommendations have been made on ease of seeding, carrying capacity, everything but palatability. Yet palatability is what puts dollars in the stockman's pocket."

Then he'll draw a couple of bars like this and he'll say:



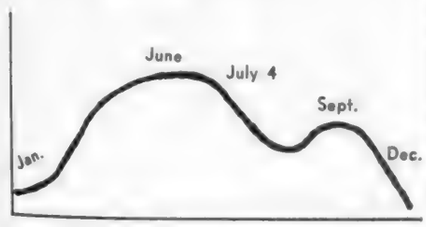
"Look, the bar on top represents the total amount of forage A that an 800-pound steer will eat in a day; the lower one represents the total amount of forage B the same steer will eat in a day. Everything to the left of line C-D in both bars is needed by the steer for maintenance, all above it goes into gains. Now, because the steer eats less of forage A, about 60 per cent of his intake goes for maintenance and only 40 per cent for gains. In the case of the other forage of which he eats more, 40 per cent of his intake will maintain him and 60 per cent goes to make gains. This can easily mean the difference of a half a pound or more a day in gains.

"A lot of farmers will tell you, 'Here's a field that has wonderful carrying capacity. I've had 10 steers on 16 acres all summer.'

"But that's not the point. The point is—are those cattle putting on gains? A field that will put .8 pound a day on 8 steers isn't as valuable as one of the same size that will put 1.4 pounds a day on 5 steers. And if you reduced the burden on the first field the steers still wouldn't gain any more because they wouldn't eat enough.

"There is no doubt about the palatability of bluegrass. Morrison in his "Feeds and Feeding" says, 'The fact that bluegrass is one of the richest of grasses in protein helps explain the fondness for it shown by stock. . . . While bluegrass is much less nutritious at the late stages of growth, even then it is grazed more readily by stock than most other grasses.' "

At this point Dr. Garrigus will pull out his pencil and draw another chart.. It will look something like this:



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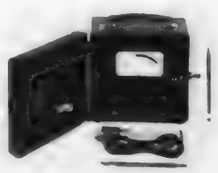

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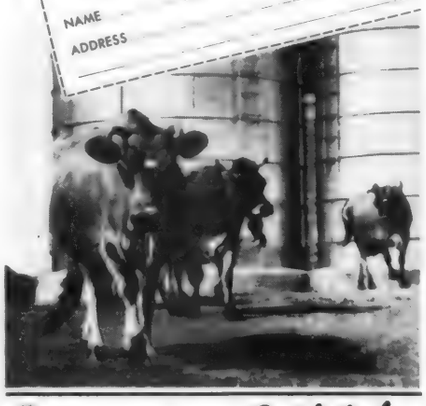

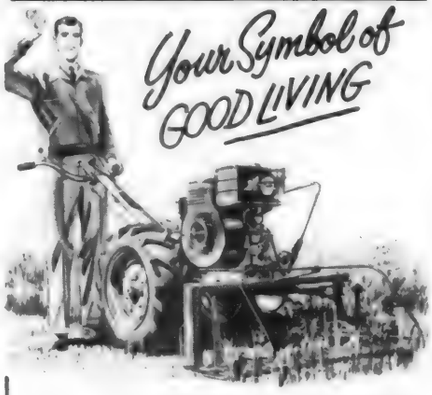

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management and in knowing when and how to use it. This little graph is a picture of the pattern of bluegrass growth —its highs and lows—throughout the year. Our spring lamb program, Kentucky's cow-calf plan, and the grass cattle plan all fit this pattern nicely.

We breed for an early lamb crop that can be marketed off the ewes in late spring and early summer, right when bluegrass pastures are at their peak. The cow-calf plan, in which cull dairy cows are bred to good beef bulls to drop their calves in late winter and early spring, calls for selling the calves off the cows as Super Baby Beeves in October or November. The grass cattle program is based on the purchase of 400 to 500 pound beef calves in the fall to capitalize on that second bulge in bluegrass production and carrying them about 21 months almost entirely on grass.

Bluegrass Silage

One of the big complaints against bluegrass is that it doesn't have the triple threat qualities of some of the other forages. It's all right for pasture, but it's not much for hay and silage.

I'm not going to try to make out a case for bluegrass hay and we don't put up any silage here ourselves. But again, I'll let Dr. Garrigus tell about the quality of the silage. He says, "Fertile bluegrass pasture will yield from a May cutting more than three tons of wilted forage for ensiling. This contains nearly three times as much digestible protein and slightly more total digestible nutrients per ton than the best corn silage."

Over at the C. V. Whitney farm, where they turn out a lot of good beef as well as some mighty fast horses, they turn the horses on their bluegrass fields first. When the horses have had their fill, the cattle are turned in. Then they make silage out of the surplus. The silage is fed to the cow herd all winter and they do excellently on it.

In Other States

By this time I probably sound like one more Colonel singing the praises of a Kentucky product. If I start bringing in testimonials from outside the state I'll sound like a patent medicine salesman. Anyhow, here's a kind of a round-up of the opinion on bluegrass from other points.

We'll start off with one on the negative side. Wisconsin doesn't like the grass. Dr. Madison Wright and Julian Sund in the Agronomy Department at the University of Wisconsin are pretty firm in their opinion that it lacks flexibility in use, that it is too slow in getting established; they claim it loses palatibility toward maturity and they find its mid-summer slump inexcusable. While they are willing to admit that there are some soils in Wisconsin that are well adapted to bluegrass they feel that most Dairyland farmers would be much happier with alfalfa-brome-Ladino

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combinations. The Minnesota Station seems to concur in this opinion.

Over in Virginia, George W. Litton, Head of the Animal Husbandry Department at V.P.I., says: "Our comparisons of bluegrass with other newer pasture plants leads us to respect bluegrass all the more. We think it is wonderful and when it receives as much plant food annually as is recommended for some of the newer mixtures it might even do better than we now believe."

Most of the high quality grass fat cattle sold out of Virginia are grazed on pastures in which bluegrass is dominant. While the grass seems to be poorly adapted to the Southern Piedmont and Coastal Plain areas, it enjoys a top rating throughout the rest of the Old Dominion.

Dr. W. H. Pierre, at Iowa State College has a good word for bluegrass, too. "I would like to emphasize," he says, "that we do not consider bluegrass 'just a weed' that should be eradicated from our permanent pastures. On the contrary, we believe that it is a valuable pasture grass."

The University of Tennessee has been running an experiment with permanent pasture for more than 15 years on what they call their McFall field at the Columbia Station. Here they have been grazing beef steers the year round on a permanent bluegrass, white and hop clover pasture. Their average per acre beef yield, year in and year out, in drought and in normal years, has been 137 pounds. H. R. Duncan, Professor of Animal Husbandry at the University, says: "A detailed analysis of returns and costs on the McFall pasture based upon land valued at $100 per acre and on beef at $20 per hundred shows that the net return on the land was 14½ per cent."

That's a pretty fair sampling of the feeling about bluegrass around the country and I have a feeling this is about the first time so many nice words have been published about bluegrass since Donerail won the Derby. It is one of those plants that has always been either just taken for granted or badly maligned.

The Seed Business

This is just in passing, but I might mention that we also get a nice dividend every year from our bluegrass seed.

By fertilizing with nitrogen and spraying for the bluegrass bugs we can control our seed production just about as closely as any corn raiser can control his crop and get yields of anywhere from 15 to 30 bushels per acre of green seed. Twenty bushels of green seed will dry out to 10 bushels of cured rough seed which was worth from $2.50 to $3.00 a bushel last year. You can graze the grass even while it is being stripped and the stripping expenses will run only about $1.75 an acre.

The bluegrass seed is harvested with a special stripper and the green seed is sacked. Sometimes the curing is done in a warehouse, but we usually truck the

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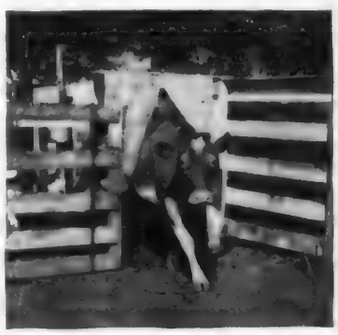

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seed to a spot on the farm we call the "bluegrass yard"—a place about an acre or so in size on which the grass has been mowed very close. The green seed is scattered out on the ground. Here it is tedded and windrowed until it is cured. Then it is again sacked and taken to the cleaner for the final step in the production of fancy seed.

Summing Up

To wrap this all up and throw it in the bin here are my conclusions on bluegrass.

It has its drawbacks. Its yields fall off sometimes to nothing in midseason; it is slow to get started, then becomes aggressive to the point where it crowds out its companion legumes if management is lax; it lacks a certain flexibility in use in that it is not adapted to short rotations; it makes a poor hay crop; and it has high fertility requirements. But against these faults its extreme palatability, its nutritiousness, the wealth of spring and fall forage it produces, and its perfect adaptation for permanent pasture on millions of acres of rolling to rough land make it a plant that still deserves a second look from any livestock raiser located in an area where it will grow.

Soil and climatic conditions in other sections would undoubtedly demand variations on our practices so far as sowing and management are concerned. In most places where bluegrass is adapted you don't even have to sow it. Put enough lime on your soil to bring it to a pH of 6.0 to 6.5 and make the nitrogen and phosphate available and you'll get bluegrass just about anywhere north of the southern Tennessee line and east of the Great Plains.

Down in this country we seldom have to apply phosphate. In other sections, however, it is generally recommended that in bringing back a badly run-down pasture 500 to 600 pounds of 0-20-10 or 0-12-12 be applied per acre.

If you must sow the seed, remember that bluegrass is strictly for long rotations or permanent pastures. Sow it in the fall on a firm seedbed and cover it lightly. Four to six pounds per acre may be enough seed if you sow it with other grasses and legumes. White clover, lespedeza, birdsfoot trefoil, red clover, Ladino and alfalfa all do well with bluegrass and will give it the nitrogen it needs.

To protect root development never graze the grass below two inches and always try to keep it under six inches in height by grazing or mowing. If it gets too high it shades out the clovers.

THE AUTHOR: A World War II tour of Africa, Anzio, Italy, and Germany as a Captain in the First Armored Division convinced Robert S. Koch that life in the open was the life for him. On his return to the U.S.A. he enrolled in the College of Agriculture at the University of Kentucky, added a degree in agriculture to the liberal arts degree he already held from Xavier University. In 1947 he stepped into his present job as manager of the Prewitt Farms at Pine Grove, Kentucky, in the heart of the bluegrass region. Cattle, sheep, tobacco, and hybrid seed corn are his principal crops. *Poa pratensis* is his favorite grass.

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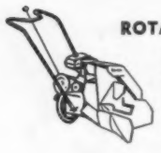

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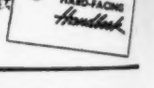

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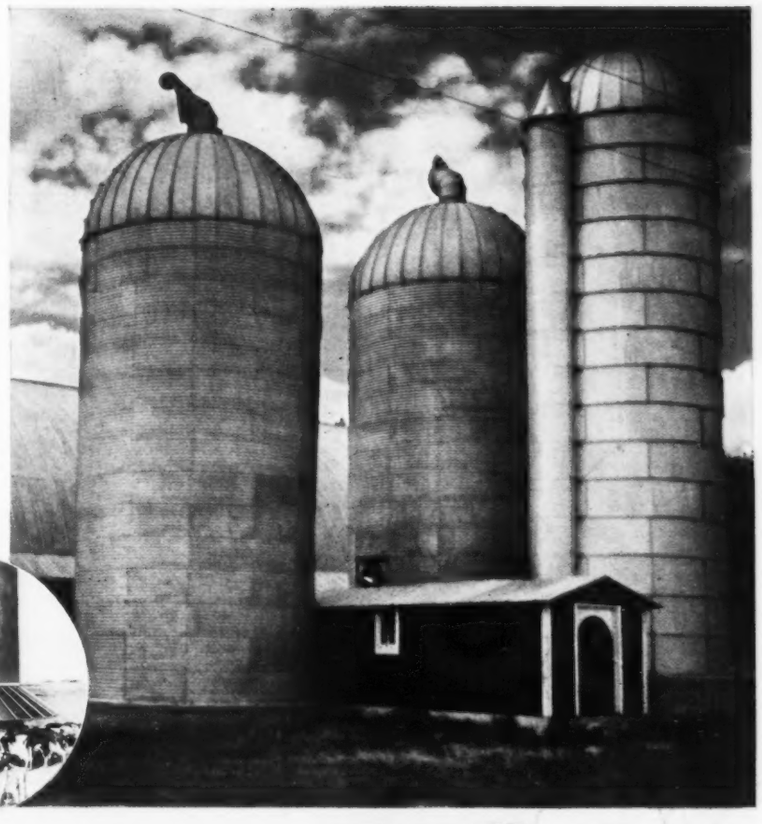

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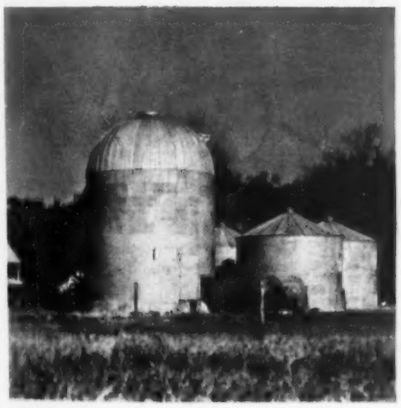

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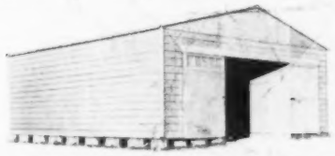

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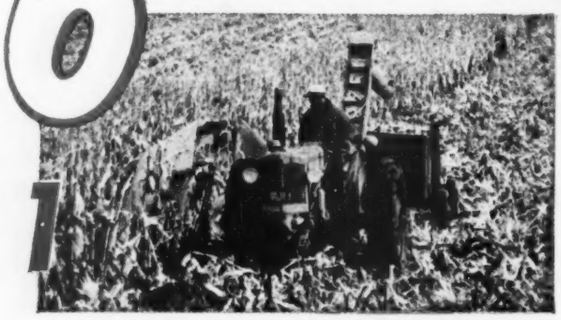

1 IMPROVED MM TWO-ROW HUSKOR

Proved and improved! This popular MM pull-behind 2-Row Huskor is packed with new MM advantages that save time, work and corn. Six gathering chains, large-capacity corn saver, dual-drive husking bed, belt-drive cleaning fan, and full Uni-Matic control of snapping assembly are outstanding features. Longer picking rolls and 12 new sectional type metal and rubber husking rolls handle your heaviest crops.

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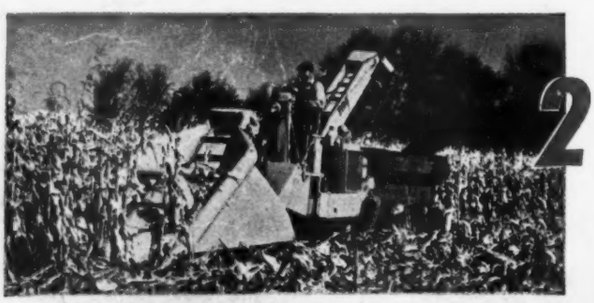


2 MM UNI-HUSKOR

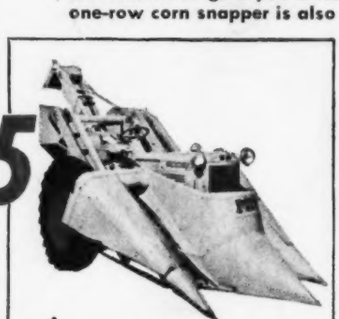
This self-propelled Uni-Huskor pays big dividends in cleaner corn, picked faster and with less work. Typical MM features include 5-position floating snouts, four 53½" long snapping rolls, ten 36" rubber and metal husking rolls, cleaning fan. A sheller unit is now available to convert the Uni-Huskor to a Uni-Picker Sheller.

3 MM 1-ROW PULL-BEHIND HUSKOR

Here's husking capacity at its one-row best. This MM Huskor gives you all the owner-tested advantages that have made MM pull-behind models preferred on so many farms, *and* the advanced features that put this year's model right out in front of the field. Three gathering chains, eight new sectional type metal and rubber husking rolls, 53½" snapping rolls, Uni-Matic control of floating snouts . . . all combine to give you a real profit harvest of your corn crop. A one-row corn snapper is also available.

4 MM UNI-PICKER SHELLER

Here's the one-man, one-trip corn harvester that picks, and shells your corn *on-the-go* . . . *and* gives you the earliest corn harvest you've ever had! It's the MM Uni-Tractor with the Uni-Picker Sheller mounted piggy-back—built to handle corn up to 30% moisture content and above when necessary. You get your corn while the stalks are still standing, in one fast, easy trip through the field.



5 NEW MM MOUNTED HUSKOR FOR THE ZB TRACTOR

With the new MM 2-Row Mounted Huskor on the new 3-plow ZB Tractor, you get self-propelled visibility and instant control. Four 53½" snapping rolls, six gathering chains, full-length and full-width husking raddle, ten 36" sectional type metal and rubber husking rolls, large capacity corn saver and Uni-Matic control are important features. This new Mounted Huskor is now available also for MM Models ZAU and ZAN tractors.

6 NEW MM MOUNTED HUSKOR FOR THE UB TRACTOR

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